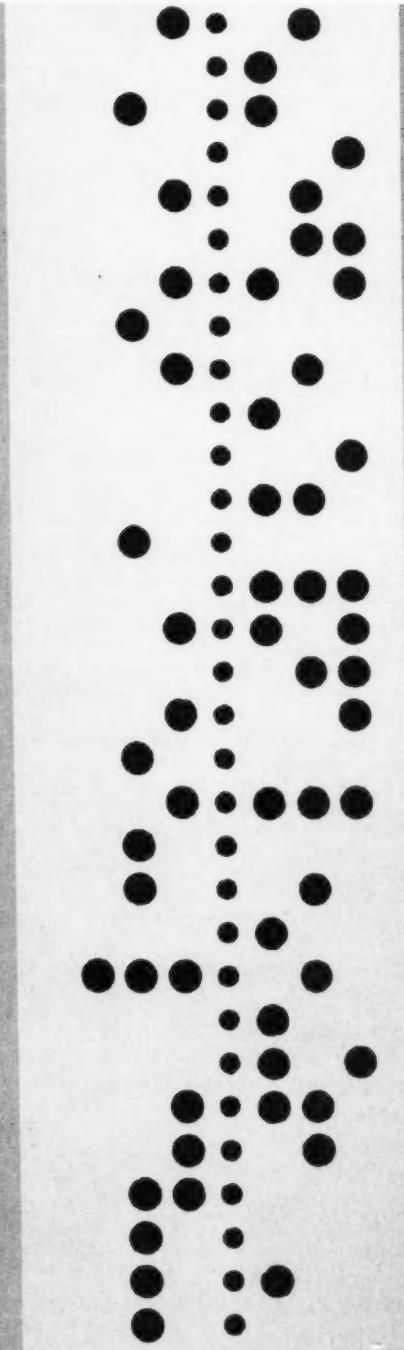
September 5, 1965

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS



A Semi-monthly Abstract Journal for Science and Industry

CLEARINGHOUSE
FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION

U. S. DEPARTMENT OF COMMERCE / NATIONAL BUREAU OF STANDARDS / INSTITUTE FOR APPLIED TECHNOLOGY

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RESEARCH AND DEVELOPMENT REPORTS

Issued twice a month by the Clearinghouse for Federal Scientific and Technical Information. Annual subscription $15 ($3.75 additional for foreign mailing). Single copy $1. Make remittance payable to Superintendent of Documents and mail either to a U.S. Department of Commerce Field Office or to Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. Address changes should be sent to Superintendent of Documents.

PURPOSE

U.S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS is published by the Clearinghouse for Federal Scientific and Technical Information to announce the availability of new reports of U.S. Government-sponsored R&D released by the Department of Defense and other Federal agencies. Included are reports from the Atomic Energy Commission and the National Aeronautics and Space Administration, which issue separate announcement journals as noted below.

FORMAT

USGRDR contains two sections with a combined table of contents. The first section, "Technical Abstract Bulletin" (TAB), announces reports released by the Defense Documentation Center (DDC) of the Department of Defense. The second section, "Other Research Reports and Related Material," announces reports released by civilian agencies and also includes certain older military reports. Reports are listed by accession/report number under 22 major subject category headings. Both sections contain abstracts and complete bibliographic citations and are followed by their respective indexes. Reports of current high industrial interest are featured in "Research Highlights."

HOW TO USE

Readers are urged to review all abstracts in their fields of interest, noting accession/report numbers and titles of reports to be ordered. Although primarily for retrieval, the descriptors provide a quick grasp of a report's scope. The reader is reminded that reports applicable to his field may be found under various subject category headings; the various indexes will aid in locating those reports. A single reference guide to new Government-sponsored technical literature, *Government-Wide Index to Federal Research and Development Reports*, is compiled monthly by the Clearinghouse from the combined indexes of this journal, *Nuclear Science Abstracts* (AEC), *Scientific and Technical Aerospace Reports* (NASA), and *Technical Abstract Bulletin* (DDC). This combined index is available from Superintendent of Documents, U.S. Government Printing Office, annual subscription $16, ($4.00 for foreign mailing) or $1.75 single copy.

TO ORDER REPORTS

All reports announced herein are available to the general public from the Clearinghouse, or in some cases from other sources as noted. To order Clearinghouse reports, use accession/report number (as given on the first line of each entry) and title from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151, or from any Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche copy (MF) are given for each entry. Prepayment is required unless purchases are to be charged to Clearinghouse deposit accounts. Order forms will be found in the back. Make check or money order payable to National Bureau of Standards—CFSTI.

OTHER JOURNALS

Reports of the National Aeronautics and Space Administration and the Atomic Energy Commission can be ordered from the Clearinghouse. They are abstracted in the following journals available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

NUCLEAR SCIENCE ABSTRACTS, Atomic Energy Commission, $30 a year domestic, $37 foreign, $1.75 single copy plus 25 percent foreign mailing.

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS. National Aeronautics and Space Administration, $33.00 a year domestic, $42.00 foreign, $2.50 single copy plus 25 cents foreign mailing.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated. Use of funds for this publication approved by the Director of the Bureau of Budget, June 30, 1961.

RESEARCH highlights

Reports of current high industrial interest

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Chemicals

ICE MELTER WITH CORROSION CONTROL

(Order AD-615 420 Chemical Means for Prevention of Accumulation of Ice, Snow, and Slush on Runways, HC $4.00/MF 75 cents.)

Outstanding ice-melting and corrosion-control properties have been displayed in a chemical mixture developed by Monsanto for use on airport runways. The mixture can rapidly melt snow, ice, and slush at temperatures as low as -10°F, and it is effective at lower temperatures but at a reduced melting rate. The pelletized material is 75 percent tripotassium phosphate-25 percent formamide, both commercially available chemicals. Although they cost more than calcium chloride, the combination causes less corrosion and does not cause excessive deterioration of runway pavements. It can be applied with the same equipment used for calcium chloride and sand, and it is nontoxic and can be manufactured at a reasonable price. During the course of this Federal Aviation Agency-sponsored study, Monsanto tried a number of chemical combinations. A collateral success was their finding that 1 percent of a sodium salt of N-(alkyl-sulfonyl)-glycine added to calcium chloride prevents steel corrosion quite well. Monsanto recommends it for highway usage.

Control Systems and Instrumentation

TABLES FOR THERMOCOUPLE TEMPERATURE MEASUREMENT

(Order ORNL-3649, Vol. 2 Smoothed Thermocouple Tables of Extended Significance, order by section, for prices see below.)

New and improved tables for the measurement of temperature by thermocouples have been prepared by the Oak Ridge National Laboratory. Covering 14 different thermocouples, the values in these tables are derived from those in the National Bureau of Standards Circular 561, but are computed to more significant digits -- to the nearest 0.001 microvolt. There is a plot of the difference in microvolts between the values in the new, or smoothed tables, and those in the NBS original. A smoothed emf value is tabulated in absolute millivolts for every degree Celsius in range of the table. The difference table is expressed in thousandths of microvolts and contains orders 0 through 5. This provides a convenient tabulation for those engaged in studying temperature difference. Although the tables are given to the nearest 0.001 microvolt which is roughly equivalent to 0.0001°C, this in no way implies, says Oak Ridge, that temperature measurements to this accuracy are possible. Users of the tables are reminded of the accuracy tolerances for thermocouples published by the American Society for Testing and Materials and the Instrument Society of America, which state limits of error equivalent to plus or minus 2.8°C from 0 to 540°C, plus or minus 0.5 percent of reading from 540 to 1480°C for standard materials, and one-half those limits for special materials. After a thermocouple has been used in the field to measure temperature, the reproducibility of the characteristic calibration curve for that thermocouple depends on such factors as the temperatures to which it has been exposed, the length of exposure to elevated or depressed temperatures, and the conditions of exposure.

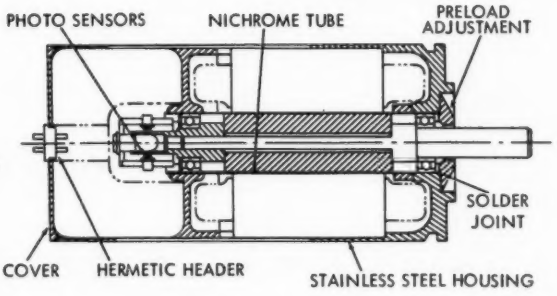
Section 2.1 Platinum vs Platinum--10% Rhodium, HC$3.00/MF$0.75.
Section 2.2 Platinum vs Platinum--13% Rhodium, HC$3.00/MF$0.75.
Section 2.3 Chromel-Alumel, HC$3.00/MF$0.50.
Section 2.4 Iron-Constantan, HC$2.00/MF$0.50.
Section 2.5 Copper-Constantan, HC$2.00/MF$0.50.
Section 2.6 Chromel-Constantan, HC$2.00/MF$0.50.
Section 2.7 Tungsten vs Tungsten--26% Rhenium, HC$3.00/MF$0.75.
Section 2.8 Tungsten-5% Rhenium vs Tungsten--26% Rhenium HC$3.00/MF$0.75.
Section 2.9 Tungsten-3% Rhenium vs Tungsten--25% Rhenium HC$3.00/MF$0.75.
Section 2.10 Gold-2.1% Cobalt vs Copper Cryogenic, HC$1.00/MF$0.50.
Section 2.11 Constantan-Copper Cryogenic, HC$1.00/MF$0.50.
Section 2.12 Alumel-Chromel Cryogenic, HC$1.00/MF$0.50.
Section 2.13 Constantan (JN)--Iron (JP) Cryogenic, HC$1.00/MF$0.50.
Section 2.14 Constantan (YN)--Iron (YP) Cryogenic, HC$1.00/MF$0.50.

Electrical

MINIATURE DC MOTOR ELIMINATES BRUSHES

(Order N65-23143 Design, Development, and Fabrication of a Sealed, Brushless DC Motor, HC $4.00/MF $1.00. N65-24377 Development of a Sealed Brushless DC Motor, HC $1.00/MF 50 cents, is also available.)

A highly reliable miniature brushless dc motor has been developed by Sperry Farragut Co., Bristol, Tenn., for NASA. The device advances the state-of-the-art in electronically commutated dc motors to a point where no performance or weight penalty remains. Photo-electronic commutation provides a means of improving reliability by eliminating brushes, making the performance of the motor more independent of environment. Photo-optical detectors and transistorized switches perform the functions of the conventional commutator without physical contact. The rotor is a permanent magnet. Hermetic sealing of the stator and commutator compartments eliminates the possibility of bearing contamination in hard-vacuum environments by outgassing from insulating materials, plastics, and solder fluxes. The motor also features a rotor-bearing assembly that can be removed as a unit from the front of the motor without disturbing its remaining components. Since the electronic commutator has built-in power amplification, the control of mechanical output by low-level control signals is possible. Where higher speed operation is feasible from the standpoint of bearing life, more power can be efficiently handled by the same motor size. Besides reducing the device more than 35 percent over existing miniature motors, researchers provided for sufficient improvement in efficiency to offset most of the losses incurred by sealing the motor. Efficiency obtained now exceeds that of a good ac inductor motor of comparable performance. A predicted reliability in excess of 95 percent for one year was achieved in tests. (N65-24377 is cited on page S-31.)



Motor construction detail.

Electronics

ACOUSTIC NAVIGATION EQUIPMENT

(Order PB-166 902 Acoustic Navigation Systems, HC $2.00/MF 50 cents.)

Equipment which permits a ship to accurately occupy a position in the open ocean beyond the range of shore-based navigation aids has been developed for the Defense Department by Bendix-Pacific Division. This equipment is an acoustic navigation system that employs bottom-mounted transponders with no depth limit to provide positioning accuracies of a few feet. The system can achieve ranges of from 5 to 15 miles (depending on the transponder used) by transmitting moderate power in the middle frequencies (about 10 kc). This also provides extremely large area coverage. The transponders receive interrogations from a ship and reply once to each interrogation. Shipboard equipment measures the elapsed time between interrogation and reply of each transponder, and this information is used to determine the ship's position relative to the array. The highly accurate system can be used for oceanographic surveys, submarine navigation for weapon firing, precise reference points where other navigation systems cannot or do not operate; and precise reference points for underwater mining, drilling, installation, search, and recovery operations.

Fuels

PERFORMANCE OF JET FUEL IN THE SUPERSONIC TRANSPORT

(Order AD-615 170 Performance of Current Quality Commercial Jet Fuel in the Supersonic Transport Airframe and Aircraft Engine Fuel System Test Rig, HC $6.00/MF $1.25.)

Tests conducted on ASTM Type A and JP-5 jet fuels in an SST engine fuel system experimental rig have been made under conditions simulating a 3500 mile flight at Mach 2.5 and Mach 3 speeds. Federal Aviation Agency-sponsored researchers report no evident problem areas at the Mach 2.5 velocity, but at Mach 3 they found deposits in the wing and fuselage tanks and vent lines, partial plugging of the engine fuel system filter, and loss of efficiency in the engine heat exchanger. The tests were made by North American Aviation with the technical assistance and direction of the FAA SST Fuels Industry Advisory Committee on which air frame, engine, and oil companies were represented. The Air Force made the laboratory analyses of fuel and deposits.

Human Factors Engineering

PROCESSES IN DECISION MAKING

(Order AD-613 180 Predecisional Processes in Decision Making: Proceedings of a Symposium, HC $6.00/MF $1.25.)

Processes in decision making were examined at a symposium conducted by the Behavioral Sciences Laboratory of the Air Force. The psychologists in attendance looked into the adequacy of present theories concerning human decision making, studied various approaches to decision situations, and analyzed predecisional processes. Overall, they concluded that making a choice is merely the final step in a chain of psychological processes. The decision maker first acquires and organizes information about a decision situation. He evaluates the information available and determines if more is necessary. Only after acquiring as much information as seems reasonable does he make a choice which he hopes is optimal. These processes of evaluating and organizing information are called predecisional processes.

Management Control, Decision Systems

INTRODUCTION TO EXPERIENCE CURVES

(Order AD-612 803 The Experience Curves, Vol. 1 (67% through 84%), HC $8.35/MF $2.50; AD-612 804 Vol. II (85% through 99%), HC $7.30/MF $2.00.)

Experience curves--sometimes called learning or improvement curves--are based on the theory that each time the total quantity of units is doubled, the hours or cost to produce the last unit of the doubled quantity will be reduced by a constant percentage. The Army Missile Command, in reporting these curves, refers to a 20 percent decrease in the effort involved in producing double quantities as an 80 percent slope, a 15 percent decrease as an 85 percent slope, and so on. For example, if a contractor manufacturing a new item took 100 direct man-hours to make the first unit, but is now operating on a 80 percent experience curve, he will need only 80 hours for the second unit. Unit number 4 should take but 64 hours, or 80 percent as much time as unit number 2. It might seem unreasonable to expect this time reduction to go on indefinitely because the time to produce a unit would get exceedingly small very fast. But such is not the case, says the Army study. The quantity of units must be doubled to get a 20 percent decrease in production time, so although the time to produce a unit steadily decreases, the quantities necessary to gain reductions in time rapidly approach an infinitely large number. The pattern of the experience curve is hyperbolic when drawn on arithmetical graph paper, a straight line when drawn on logarithmic (log-log) paper.

Information Technology

PROCESSING CRIME INFORMATION MECHANICALLY

(Order AD-615 720 Crime Pattern Recognition in Natural Language, HC $1.00/MF 50 cents.)

A computer program has been developed by System Development Corp. to process crime information with the participation of the Los Angeles Police Department. The object of the program was to determine the feasibility of using natural processing techniques to assist patrol officers and detectives in crime pattern recognition. By crime pattern recognition, developers mean a wide range of crime analysis applications (mode of operation, vehicles or weapons used, physical descriptions, speech patterns, etc.) that can be used for crime pattern recognition. The system appears to be useful in at least three applications: in combating a series of related crimes, in developing possible suspects, and in clearing cases committed by a suspect.

Nuclear Technology

HIGH-LEVEL RADIATION RESEARCH LABORATORY

(Order AD-615 366 The Design, Construction, and Equipment of a New High-Level Radiation Laboratory at NRL, HC $2.75/MF $1.00.)

Design, construction details and collateral equipment of a high-level radiation laboratory are given in a report prepared by the Naval Research Laboratory. The report can be used by many smaller laboratories who want to operate hot-labs and need the recommendations of those who have had the staff plus the resources to develop facilities that represent the best in the field. The high-level radiation lab described was built for NRL in Washington, D. C., to provide a means for safely conducting research on gamma-active materials. Primary purpose of the facility is to provide a capability for a wide variety of studies and experiments on the effects of radiation on structural and other materials. The hot cells, comprising the most important part of the facility, were designed to provide a means of safely handling and investigating radioactive materials in the most efficient and economical manner. To implement this goal, a great deal of attention was given to incorporating advanced features that would provide substantial gains in research productivity. Since research on radiation effects in materials is new and of long-range scope, it was considered desirable that the new facility should have a useful and productive research life of at least 25 years. This life expectancy had an important influence on the design features.

Transportation

NATIONAL CAPITAL SUBWAY

(Order PB-167 714 Rail Rapid Transit for the Nation's Capital, HC $2.00/MF 50 cents.)

A publication containing the proposed rapid transit development program for the national capital region has been prepared by the National Capital Transportation Agency. The document gives engineering details, data on expected revenues and expenses, financing, and organization and operation of the system. The NCTA plan calls for a $431 million system with 25 miles of rail rapid transit lines of which 13 miles will be subway.

The abundance of R/D reports available creates a problem for industry in extracting those most likely to prove of value--for technical solutions and in keeping up with new developments. These Clearinghouse tools and services, and others planned, are designed to narrow the search.

PINPOINTING R&D REPORTS

Selection Aids For Industry

▶ GOVERNMENT-WIDE INDEX appearing monthly is a single reference guide to Government-sponsored research and development announced in four of the major technical announcement journals of the Federal Government: USGRDR, Technical Abstract Bulletin of the Defense Documentation Center, Nuclear Science Abstracts of the Atomic Energy Commission, and Scientific and Technical Aerospace Reports of the National Aeronautics and Space Administration. (Annual Subscription $10, $2.50 additional for foreign mailing, $1.25 single copy.) Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D. C., 20402.

▶ SELECTIVE BIBLIOGRAPHIES--from Abrasives to Zirconium--will be mailed free. A list of more than 200 available from the Clearinghouse will be mailed on request. Here is a sample list of ten:

SB-441 Materials Testing	SB-523 Batteries
SB-444 Electronic Miniaturization	SB-524 Expanded Plastics
SB-480 Textile Fibers	SB-526 Metal Composites
SB-515 Paper	SB-529 Hydrofoil Boats
SB-518 Paints and Varnishes	SB-541 Fluid Amplifiers

▶ LITERATURE SEARCHING SERVICE provides two kinds of bibliographies:

a) Current Awareness on selected fields of interest on a periodic basis.

b) Retrospective, listing the literature available to date.

These searches are made to order using the combined facilities of the Clearinghouse, the Science and Technology Division of the Library of Congress and the science collections of the Departments of the Interior and Agriculture, or any combination of these facilities at $11 an hour (8 hours minimum searching time).

▶ FAST ANNOUNCEMENT SERVICE reviews reports of special industrial significance. Announcements are classified and mailed by industrial category. No charge.

Continued next page.

▶ RESEARCH REVIEWS, compiled by the National Bureau of Standards under titles of industrial interest, are summaries and bibliographies of R/D reports which for the most part are part of the Clearinghouse collection. These Research Reviews are available at no charge from the Clearinghouse.

OTR–101	Hot Machining
OTR–102	Nickel-Titanium Alloys
OTR–103	Photochromism and Phototropism
OTR–104	Fire-Extinguishing Material Technology
OTR–105	Flame-Retardant Textiles
OTR–106	Humidity-Controlled Warehousing
OTR–107	Concrete Technology
OTR–108	Volatile Corrosion Inhibitors
OTR–109	Grease Lubrication
OTR–110	Thermoelectric Materials & Fabrication
OTR–111	Integrated Circuitry
OTR–112	Fluid Amplification
OTR–113	Ultrasonic Fabrication
OTR–114	Ultrasonic Testing
OTR–115	High Energy Metal Forming
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OTR–119	Honeycomb and Sandwich Materials
OTR–120	Microminiature Circuit Packaging Techniques
OTR–121	Foam Technology and Application
OTR–122	Dispersion-Hardened Metals & Alloys
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OTR–124	Nondestructive Evaluation of Materials
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Section I TECHNICAL ABSTRACT BULLETIN from Page 1 to 172 (Printed on white paper). Announces Department of Defense reports released to the public by the Defense Documentation Center. In addition this section includes citations of various articles in non-Government journals, certain Government Printing Office publications, and similar documents of potential interest to Clearinghouse customers. Announcement is made only as a referral service. Readers interested in obtaining copies of these documents should consult the availability statement that accompanies each entry. This section is follwed by indexes beginning on page A-1.

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01 AERONAUTICS — Page No.

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities. See also related fields: 16 Missile Technology, 17 Navigation, Communications, Detection, and Countermeasures, 20 Physics, and 22 Space Technology..... 1, S-1

02 AGRICULTURE

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry. See also related field: 06 Biological and Medical Sciences..... 7, S-3

03 ASTRONOMY AND ASTROPHYSICS

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04 ATMOSPHERIC SCIENCES

Includes atmospheric physics and meteorology..... 10, S-5

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Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology. See also related field: 06 Biological and Medical Sciences..... 16, S-7

06 BIOLOGICAL AND MEDICAL SCIENCES

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects. See also related fields: 02 Agriculture, 05 Behavioral and Social Sciences, and 07 Chemistry..... 29, S-16

07 CHEMISTRY

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry. See also related fields: 06 Biological and Medical Sciences, 11 Materials, 20 Physics, and 21 Propulsion and Fuels..... 53, S-21

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Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism. See also related field: 04 Atmospheric Sciences..... 62, S-26

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10 ENERGY CONVERSION (Non-Propulsive)

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Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering. See also related fields: 07 Chemistry and 09 Electronics and Electrical Engineering..... 104, S-55

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Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics. See also related fields: 16 Missile Technology and 17 Navigation, Communications, Detection and Countermeasures..... 116, S-63

16 MISSILE TECHNOLOGY

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Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection. See also related fields: 09 Electronics and Electrical Engineering and 20 Physics..... 118, S-65

18 NUCLEAR SCIENCE AND TECHNOLOGY

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear power plants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology. See also related fields: 07 Chemistry, 15 Military Sciences, 18 Nuclear Science and Technology, 20 Physics, and 21 Propulsion and Fuels..... 124, S-66

19 ORDNANCE

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance. See also related field: 18 Nuclear Science and Technology..... 127, S-73

20 PHYSICS

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation. See also related fields: 03 Astronomy and Astrophysics, 07 Chemistry, 09 Electronics and Electrical Engineering, 10 Energy Conversion (Non-propulsive), 11 Materials, 13 Mechanical, Industrial, Civil, and Marine Engineering, and 17 Navigation, Communications, Detection, and Countermeasures..... 129, S-75

21 PROPULSION AND FUELS

Includes air-breathing engines; combustion and ignition; electric propulsion; fuels; jet and gas turbine engines; nuclear propulsion; reciprocating engines; rocket motors and engines; and rocket propellants. See also related fields: 07 Chemistry and 20 Physics..... 168, S-85

22 SPACE TECHNOLOGY

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TECHNICAL ABSTRACT BULLETIN

01. Aeronautics

AD-617 925 Div. 9/6, 1/2
CFSTI Prices: HC$4.00 MF$1.00

Vidya Div., Itek Corp., Palo Alto, Calif.
THEORETICAL AERODYNAMICS OF FLEXIBLE WINGS AT LOW SPEEDS. IV. EXPERIMENTAL PROGRAM AND COMPARISON WITH THEORY.
Final rept. for Feb 64-Feb 65,
by Jack A. Burnell and Jack N. Nielsen. 15 Feb 65, 127p Vidya rept. no. 172
Contract Nonr372800, Proj. 9064

Unclassified report

Descriptors: (*Parawings, Aerodynamic characteristics), (*Wings, Flexible structures), Subsonic characteristics, Slender bodies, Aerodynamic configurations, Aerodynamic loading, Lift, Drag, Flutter, Tests, Theory, Aspect ratio, Numerical analysis, Data, Graphics.

As Part IV of a general parawing study, low-speed measurements have been made of the aerodynamic characteristics of triangular one-lobed and two-lobed parawings of aspect ratios 1, 2, and 3 for comparison with the theory of Parts I and II of the study. It was found that this theory is adequate for determining the canopy shapes, the luffing boundaries, and the lift characteristics for parawings of low to moderate slackness ratio. The measured center of pressure positions are slightly forward of the theoretical position as a result, it is thought, of the presence of the leading-edge members. Also, the aerodynamic design of the leading-edge members is such that from 20 percent to 70 percent of the theoretical leading-edge suction is realized. The maximum lift-drag ratios appear to be adversely affected by trailing-edge flutter which in some cases is so intense as to preclude aerodynamic testing at angles of attack for maximum lift-drag ratio. A parawing of aspect ratio 8.5 with a taut trailing-edge cable exhibited no flutter, and when the tension was relieved the flutter was intense and the maximum lift-drag ratio actually increased. (Author)

AD-617 931 Div. 9/6
CFSTI Prices: HC$3.00 MF$0.75

Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
APPLICATIONS OF A HIGH-FREQUENCY AERODYNAMIC THEORY TO THE CALCULATION OF FLUTTER AT SUPERSONIC SPEEDS.
Final rept.,
by M. Hanin and E. Nissim. 31 Dec 64, 60p
Rept. no. TAE-36
Grant AF EOAR63 66, Proj. 9781, Task 978101
AFOSR 65-1008

Unclassified report

Descriptors: (*Flutter, Supersonic airfoils), (*Supersonic flight, Flutter), Deformation, Aerodynamic loading, Ailerons, Numerical analysis, Aeroelasticity, Thickness, Israel, Theory.

Flutter of airfoil sections in bending, torsion, and control-surface rotation at supersonic flight speeds is analysed by employing an aerodynamic solution for high-frequency oscillations. The analysis includes effects of airfoil thickness and shape, and is valid at arbitrary supersonic Mach numbers and sufficiently high values of frequency variable. For flutter problems with two degrees of freedom (bending-torsion, bending-aileron, torsion-aileron) explicit expressions for calculating the flutter speed and frequency are obtained. The case of three degrees of freedom (bending-torsion-aileron flutter) is studied by solving the determinant equation numerically. Some calculated results are presented, showing the variation of flutter boundaries with the elastic and inertial properties of the airfoil, the flight conditions and the airfoil thickness. (Author)

AD-617 934 Div. 9/7, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Electro-Optical Systems, Inc., Pasadena, Calif.
TURBULENT MIXING IN THE BASE FLOW REGION.
Research notes,
by Hartley H. King and M. Richard Denston.
May 65, 61p Rept. no. EOS-RN-24
Contract AF04 694 570, ARPA Order 254 62

Unclassified report

Descriptors: (*Reentry vehicles, Wake), (*Jet mixing flow, Turbulence), (*Base flow, Turbulence), Atmosphere entry, Hypersonic flight, Laminar flow, Viscosity, Enthalpy, Conical bodies, Wedges, Hypersonic flow, Integral equations.

An exploratory study is made in connection with the problem of predicting properties of the turbulent base flow region of a body at hypersonic speeds. An attempt is made to calculate the gross features of the base flow using a non-similar mixing model including the Chapman-Korst recompression condition. The expression for the eddy viscosity is based on a model which allows the turbulent equations to be transformed into incompressible laminar form. The empirical factor in the eddy viscosity expression is evaluated from data obtained from the near field (in the linear growth region) of jets exhausting into a quiescent region. The same expression for the eddy viscosity is then used in an attempt to estimate the growth of non-similar turbulent mixing layer using both turbulent and laminar initial profiles. The correlation of turbulent jet mixing data for speeds up to Mach 3 shows that the eddy viscosity is a very strong function of Mach number (or of density ratio across the jet, since the data are for adiabatic flow). If the eddy viscosity dependence on density ratio persists for density ratios typical of re-entry conditions, then it is found that at these conditions the growth rate of the turbulent shear layer is orders of magnitude slower approaching the rate of growth of the laminar mixing layer under the same conditions. (Author)

AD-617 935 Div. 1/4, 28/3
CFSTI Prices: HC$3.00 MF$0.75

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
SOME FACTORS INFLUENCING HUMAN RESPONSE TO AIRCRAFT NOISE: MASKING OF SPEECH AND VARIABILITY OF SUBJECTIVE JUDGMENTS.
Technical rept.,
by K. D. Kryter and C. E. Williams. Jun 65, 72p
Rept. no. BBN-1234
Contract FA64WA4951, Proj. 361 12H
FAA-ADS 42

Descriptors: (*Airplane noise, Reaction(Psychology)), (*Speech recognition, Airplane noise), Thresholds-(Physiology), Speech, Intelligibility, Hearing, Tolerances-(Physiology), Psychoacoustics, Statistical analysis, Graphics.

Statistics of the variability of subjective judgments of the loudness and noisiness of pure tones and complex sounds as studied in the laboratory and in the field are presented. An analysis of possible sources or causes of this variability is made in terms of test-retest reliability, differences among subjects, type of sounds judged and experimental method used in obtaining judgments. Possible contributions to variability of judgments due to differences in the size of the external ear and the thresholds of auditory sensitivity at different sound frequencies for different age groups are discussed. Word intelligibility tests at various intensity levels were administered to a crew of trained listeners in the presence of recorded noise from jet and propeller-driven aircraft. The noise was that which would be present outdoors and in a house as the result of engine run-up operations and when the aircraft were flying overhead shortly after take-off and prior to landing. Methods of measuring or evaluating aircraft noise predict the results of the speech tests in the following order of merit, from best to worse: (1) Articulation Index (AI); (2) and (3) perceived noise level in PNdB and Speech Interference Level (SIL) (SIL and PNdB appear to predict the masking of speech about equally well); (4) Noise Criteria (NC); (5) overall SPL, A scale; and (6) overall sound pressure level, C scale. (Author)

AD-617 945 Div. 1/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
WORLD'S RECORD OF AVIATOR, ALEKSANDER FEDOTOV,
by G. Mosolov. 9 Jul 65, 7p Rept. no. FTD-TT-65-545
TT 65-62623

Unclassified report

Unedited rough draft trans. from Pravda, Moscow (USSR) 18Apr 1965.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Pilots, Flight testing), (*Aircraft, Flight speeds), (*Flight speeds, USSR), Aviation personnel.

AD-617 946 Div. 1/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEW GLIDERS,
by V. Plaksin. 12 Jul 65, 9p Rept. no. FTD-TT-65-833
TT 65-62622

Unclassified report

Unedited rough draft trans. of Krylya Rodiny (USSR) v11 n7 p17-8 1960
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Gliders, USSR), Design, Flight control systems, Aerodynamic characteristics, Landing gear, Flight instruments, Flight speeds.

The flight characteristics and design data of two Russian sport gliders are presented.

AD-617 966 Div. 1/8, 1/9, 1/2
CFSTI Prices: HC$3.00 MF$0.75

Lockheed-California Co., Burbank, Calif.
EXPLORATION OF HIGH-SPEED FLIGHT WITH THE XH-51A RIGID ROTOR HELICOPTER.
Final rept. for Apr-Nov 64,
by William K. Foulke. Jun 65, 86p
Rept. no. LR-18374
Contract DA44 177AMC150T, Task 1P121401A14311
USAAML TR-65-25

Unclassified report

Descriptors: (*Helicopter rotors, Performance-(Engineering)), (*Helicopters, Design), Flight, Airspeed, Flight testing, Rotor blades(Rotary wings), Aerodynamic loading, Nacelles, Tests.

A systematic research program to investigate the capability of the Lockheed-developed 'rigid' rotor system in the XH-51A helicopters is discussed. The primary objective of the research program was to attain level flight performance at a true airspeed of 200 knots; 210 knots true airspeed was actually attained with the Compound XH-51A. Analytical studies, design, fabrication and modification, laboratory tests, wind tunnel and ground tests, and research flight tests of two rotor configurations and a 'compound' version of the helicopter were performed. (Author)

AD-618 064 Div. 33/1
CFSTI Prices: HC$3.00 MF$0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
NUMERICAL ANALYSIS FOR TWO-LAYERED PAVEMENT SYSTEMS.
Final technical rept. for 1 Jul-1 Nov 64,
by W. L. Wilcoxson and J. P. Nielsen. Jul 65, 75p
Rept. no. TR-R-378
Proj. Y F015 15 02 119

Unclassified report

Descriptors: (*Pavements, Airports), (*Runways, Soil mechanics), (*Soil mechanics, Numerical analysis), (*Compressive properties, Runways), Trafficability, Integrals, Design, Graphics, Landing fields.

Techniques are presented for numerically evaluating the Burmister integral expression for the settlement coefficient at ground level, F sub w, in a layered-pavement system. Also, an economical and efficient means of evaluating F sub w is demonstrated, along with means for estimating the error associated with each evaluation. The influence curves presented will find immediate application in the design of airfield pavements and in the evaluation of existing runways. Included are the technical details for evaluating the settlement coefficient and data for constructing additional curves. (Author)

AD-618 074 Div. 9/7, 25/3, 4/4
CFSTI Prices: HC$3.00 MF$0.75

Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
EFFECT OF THE KINETICS OF CONTAMINANTS ON WAKE IONIZATION.
Technical memo.,
by J. Eckerman, R. Buck, H. Lien, and D. Argentini.
Jun 65, 79p Rept. no. RAD-TM-65-30
Contract DA31 124ARO D218, ARPA Order 553
AROD 5136;6

Unclassified report

Descriptors: (*Recombination reactions, Reaction

kinetics), (*Wake, Gas ionization), (*Plasma medium, Wake), Hypersonic flight, High-temperature research, Turbulence, Probes(Electromagnetic), Argon, Cesium, Vapors, Spheres, Nonequilibrium flow, Projectiles.

Experimental values for recombination rates between electrons and cesium ions are presented in this report. Measurements cover temperatures from 4300K to 1200K at electron densities from 1.5 x 10 to the 14th power to 2 x 10 to the 12th power/cc. The cesium plasma is generated by a high-velocity steel spherical projectile fired into a special chemical kinetics ballistic range. Microwave F-band and Ka-band focused probe measurements of electron density were made as a function of time at two wave locations. Measured and calculated electron density decays are shown to agree satisfactorily. The experimental recombination rates are compared to theoretical values. The experimental apparatus and techniques are described in detail. (Author)

AD-618 083 Div. 9/6
CFSTI Prices: HC$2.00 MF$0.50

Space and Information Systems Div. North American Aviation, Inc., Downey, Calif.
UNSTEADY AERODYNAMICS FOR ADVANCED CONFIGURATIONS. PART III. ELLIPTIC-CONICAL WING IN LINEARIZED UNSTEADY TRANSONIC FLOW,
by E. Albano and L. V. Andrews. May 65, 47p
Rept. no. SID-64-1512-3
Contract AF33 657 10399, Proj. 1370, Task 137003
FDL TDR-64-152 P3
Unclassified report

Descriptors: (*Transonic flow, Wings), (*Wings, Aerodynamic loading), Conical bodies, Ellipsoids, Oscillation, Pressure, Thickness, Pitch(Motion), Iterative methods, Blunt bodies, Lift, Moments, Distribution, Corrections, Integrals, Boundary layer.

Pressure distributions were calculated for an elliptic cone performing plunging oscillations at sonic speed. The objective was to study the effect of blunt leading edges and wing thickness. Second order expressions in terms of the parameter (frequency times aspect ratio squared) for velocity potentials, pressure coefficients, and total lift and moment were derived using an iteration procedure and extended for unsteady transonic flow. The results indicate the possibility of developing simple formulas which will give accurate corrections throughout a wide speed range for the effects of leading-edge bluntness on airfoil pressure distributions. An extension of the analysis to account for pitching oscillations or to any flexible vibration mode, involving only chordwise deformations, would be straightforward but laborious. Also, one could treat without much additional difficulty planforms with curved leading edges. The possibility of treatment of flexible vibration modes, involving spanwise deformations, would depend upon successful evaluation of appropriate modifications of integrals contained in the report. (Author)

AD-618 085 Div. 33/1, 1/4
CFSTI Prices: HC$3.00 MF$0.75

Ohio Univ., Athens. Dept. of Electrical Engineering.
EARTH COVER AND CONTOUR EFFECTS ON IMAGE GLIDE PATHS.
Final rept.,
by Richard H. McFarland, David Hill, and Donald Luttermoser. 21 May 65, 99p Rept. no. EER-5-1
Contract FA64WA5060, Proj. 320 101 01R
SRDS RD65 30 Unclassified report

Descriptors: (*Flight paths, Landings), (*Terrain, Instrument landings), (*Landing fields, Terrain), Dielectric properties, Scattering, Mathematical models, Snow, Site selection, Flight, Integral equations.

Mathematical models of the Null-Reference and Capture-Effect glide paths in the presence of snow covered and irregular ground planes are presented. From these equations variations in glide-path position are determined for specific ground contours and covers. Greater Pittsburgh Airport site is considered as an example for which equations are solved using a 7090 computer. The results show that certain portions of the glide path are quite rough, and this agrees with previous flight measurements. (Author)

AD-618 096 Div. 9/6
CFSTI Prices: HC$4.00 MF$1.00

Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.
UNSTEADY AERODYNAMICS FOR ADVANCED CONFIGURATIONS. PART I. APPLICATION OF THE SUBSONIC KERNEL FUNCTION TO NONPLANAR LIFTING SURFACES.
Technical documentary rept.,
by H. T. Vivian and L. V. Andrew. May 65, 118p
Rept. no. SID-64-1512-1
Contract AF33 657 10399, Proj. 1370, Task 137003
FDL TDR-64-152 P1
Unclassified report

Descriptors: (*Lift, Integral equations), (*Airfoils, Supersonic flow), Programming(Computers), Aerodynamic configurations, Turbulence, Aerodynamic characteristics, Wings, Acceleration, Boundary layer.

Equations for pressure distributions and generalized aerodynamic forces are derived for a thin nonplanar lifting surface in simple harmonic motion at subsonic speeds. A digital computer program, written in Fortran IV, is also presented. The computer program will generate up to a ten by ten matrix of generalized aerodynamic forces when given data for the geometry of a planar lifting surface with a folded planar tip, the flight Mach number, the reduced frequency of motion, and some control constants. Control surface deflections are not accounted for in the study. A kernel function method, which relates the pressure distribution to the downwash on a planar lifting surface, was extended and applied to a nonplanar lifting surface. Hsu's technique (PB-139 207) of employing Gaussian quadrature formulas is used when integrating the product of the kernal function and the lift function over the planform area. Recommendations are made to extend the method to account for blunted leading edges and the accompanying airfoil thickness and to account for control surface deflections. (Author)

AD-618 097 Div. 9/6
CFSTI Prices: HC$5.00 MF$1.00

Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.
UNSTEADY AERODYNAMICS FOR ADVANCED CONFIGURATIONS. PART II. A TRANSONIC BOX METHOD FOR PLANAR LIFTING SURFACES.
Technical documentary rept.,
by E. R. Rodemich and L. V. Andrew. May 65, 121p
Rept. no. SID-64-1512-2
Contract AF33 657 10399, Proj. 1370, Task 137003
FDL TDR-64-152 P2 Unclassified report

See also AD-618 096.

Descriptors: (*Lift, Mathematical analysis), (*Wings, Oscillation), Transonic flow, Differential equations, Boundary value problems, Statistical functions, Trailing control surfaces, Programming(Computers), Least squares method, Aerodynamic loading, Aerodynamic configurations, Aspect ratio, Turbulence.

The fundamental equations of the transonic box method were derived, based on the representation of the velocity potential by a doublet distribution. They form the basis of a systematic method of treating an oscillating wing at M = 1, analogous to the supersonic Mach box method. A digital computer program, written in Fortran IV, is presented. The program applies to a planar wing of polygonal planform, with a straight trailing edge, and as many as three sweep angles along the leading edge. For a maximum of ten modes of oscillation, the program computes the oscillatory potentials and pressures and a generalized force matrix. Results obtained from the program are compared with existing theoretical and experimental values. Several possible extensions of the method are described. (Author)

AD-618 190 Div. 33/1, 28/5, 32/1, 1/4
CFSTI Prices: HC$3.00 MF$0.75

Bolt, Beranek, and Newman, Inc., Los Angeles, Calif.
ANALYSIS OF COMMUNITY AND AIRPORT RELATIONSHIPS/NOISE ABATEMENT. VOLUME I. AN APPROACH TO ANALYSIS OF AIRCRAFT NOISE PROBLEMS USING COMPUTER-AIDED TECHNIQUES.
Technical rept. for May 63-Apr 64,
by Welden E. Clark. Dec 64, 73p
Rept. no. BBN-1093, Vol. 1
Contract FA WA4409, Proj. 430 001 01R
SRDS RD-64-148 V1

Unclassified report

Descriptors: (*Airplane noise, Urban areas), (*Urban areas, Airplane noise), (*Programming(Computers), Airplane noise), Flight paths, Urban planning, Air transportation, Jet plane noise, Commercial planes, Digital computers, Public opinion, Public relations.

Development of a computer-aided approach to the analysis of aircraft noise as it affects communities near airports is summarized in the report. The major factors that must be described to specify the noise stimulus and the factors which appear to be relevant to description of the community-wide response to that noise are discussed and diagrammed. An approach to analysis of aircraft noise situations that involves close man-computer interaction is formulated and programming to implement this approach is described. Some illustrations of the process are presented. The major computer programs being developed will: (a) calculate perceived noise levels from octave band noise spectra; (b) calculate areas from graphical input data (maps, noise contours); (c) calculate and display noise contours for a simulated aircraft flight; (d) calculate the time pattern of noise exposure at a ground position near an aircraft flight path; and (e) calculate and assemble the noise levels occurring at multiple ground positions during a number of simulated aircraft flights. (Author)

AD-618 191 Div. 33/1, 28/5, 32/1, 1/4
CFSTI Prices: HC$4.00 MF$0.75

Bolt, Beranek, and Newman, Inc., Los Angeles, Calif.
ANALYSIS OF COMMUNITY AND AIRPORT RELATIONSHIPS NOISE ABATEMENT. VOLUME II. DEVELOPMENT OF AIRCRAFT NOISE COMPATIBILITY CRITERIA FOR VARIED LAND USES.
Technical rept. for May 63-Apr 64,
by Dwight E. Bishop. Dec 64, 108p
Rept. no. BBN-1093, Vol. 2
Contract FA WA4409, Proj. 430 001 01R
SRDS RD-64-148 V2

Unclassified report

Descriptors: (*Airplane noise, Urban areas), (*Urban planning, Airplane noise), Buildings, Construction, Jet plane noise, Commercial planes, Public opinion, Public relations.

The report describes two simplified procedures for analyzing aircraft noise in the vicinity of airports to determine: (a) whether or not aircraft noise will interfere with work activities or land use, and (b) what building arrangements and construction features should be incorporated in building design so that aircraft noise will not interfere with planned activities inside buildings. The first procedure is general in nature and defines aircraft noise acceptability criteria for broad categories of land use (residential, commercial, industrial, etc.). The second procedure provides methods for developing aircraft noise criteria for specific work activities having varying degrees of dependence upon speech communication or freedom from noise interference; it also specifies methods for evaluating the noise protection afforded by different types of building construction and building arrangements.

AD-618 192 Div. 33/1, 28/5, 32/1, 1/4
CFSTI Prices: HC$2.00 MF$0.50

Bolt, Beranek, and Newman, Inc., Los Angeles, Calif.
ANALYSIS OF COMMUNITY AND AIRPORT RELATIONSHIPS/NOISE ABATEMENT. VOLUME III. DISCUSSION OF SOME LEGAL ASPECTS OF AIRCRAFT NOISE.
Technical rept. for May 63-Apr 64,
by Dwight E. Bishop. Dec 64, 31p
Rept. no. BBN-1093
Contract FA WA4409, Proj. 430 001 01R
SRDS RD-64-148, V3

Unclassified report

Descriptors: (*Airplane noise, Urban areas), (*Law, Airplane noise), (*Urban areas, Airplane noise), Urban planning, Air transportation, Jet plane noise, Commercial planes, Maintenance, Public opinion, Public relations.

The report discusses legal aspects helpful in understanding some of the actions taken by individuals or by groups in a community responding to aircraft noise. Possible legal actions, with an assessment of the probability of successfully sustaining legal action, are discussed in terms of the physical relationship of aircraft and the ground observer, and the type of noise exposure which is likely to be encountered with current commercial aircraft operations. (Author)

AD-618 197 Div. 33/1
CFSTI Prices: HC$1.00 MF$0.50

Systems Research and Development Service,
Federal Aviation Agency, Washington, D. C.
SCHEDULED AIR CARRIER FLIGHT ACTIVITY IN THE UNITED STATES, MAY 1965.
Interim rept.,
by Ellen S. Reynolds. Jul 65, 23p
Rept. no. RD-65-76
Proj. 141 411 01A

Unclassified report

Descriptors: (*Commercial planes, Air traffic), (*Transport planes, Air traffic), (*Air traffic, Scheduling), Flight, United States, Numerical analysis.

In May 1965, community pairs exchanging a total of 100 or more flights were Los Angeles-San Francisco, Boston-New York, and Cleveland-Detroit. Total scheduled air carrier flights for May 1965 increased slightly more than 5% over November 1964. Total flights by piston and turbo-prop aircraft show a slight decrease over November 1964, while the number of flights by turbo-jet aircraft increased 3%. (Author)

AD-618 252 Div. 9/6, 1/2

Cincinnati Univ., Ohio.
THICKNESS EFFECT ON THE FORCE OF SLENDER DELTA WINGS IN HYPERSONIC FLOW.
Revised ed.,
by Kinzo Hida. 17 Nov 64, 9p
Contract AF33 616 8453, Proj. 7064
ARL 65-143

Unclassified report

Pub. in A I A A Journal v3 n3 p427-33 Mar 1965 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted 8 Jun 64.

Descriptors: (*Delta wings, Hypersonic characteristics), Thickness, Slender bodies, Force(Mechanics), Aerodynamic loading, Hypersonic flow, Angle of attack, Boundary layer, Shock waves, Mathematical analysis.

Newtonian flow theory for a conical flow field was applied to estimate the thickness effect on the force of slender delta wings at moderate angle of attack. Assuming the shock shape in a cross plane perpendicular to the wing, the pressure coefficient was obtained for wings with either diamond or lens-type cross section. Comparison with both other theoretical and experimental works was made. It can be concluded that the thickness of a wing diminishes the normal force for smaller values of the parameters but increases it for larger values, where there is a similarity parameter introduced by Messiter. (Author)

AD-618 294 Div. 9/6
CFSTI Prices: HC$2.00 MF$0.50

North American Aviation, Inc., Los Angeles, Calif.
ON THE HYPERSONIC FLOW OVER A DELTA WING WITH VERY SUPERSONIC LEADING EDGES.
Interim rept. for 1 Jan-7 Mar 65 (Revised ed.),
by Norman D. Malmuth. 1 Jun 65, 26p
Rept. no. NA-65-275
Contract AF49 638 1477, Proj. 9781, Task 978101
AFOSR 65-0757

Unclassified report

Revision of report dated 24 Mar 65.

Descriptors: (*Delta wings, Hypersonic flow), (*Supersonic airfoils, Delta wings), Boundary value problems, Shock waves, Perturbation theory, Numerical analysis, Flat plate models, Differential equations.

For the case of very supersonic leading edges, the inviscid hypersonic flow over the windward side of a symmetrical flat-plate delta wing at incidence is analyzed. The limit selected is that the incidence is of higher order than the aspect ratio as the incidence tends to zero at infinite Mach number. In this framework, the flow regions consist of a two-dimensional domain adjacent to the leading edges and a central conefield. The flow quantities in the central region represent small linear, rotational perturbations about the zero sweep flow. A Riemann-Poincare boundary value problem for the pressure perturbation is formulated. An additional condition involving the sidewash at the shock is found to be required to resolve the indeterminacy of the foregoing boundary value problem. Series solutions and numerical results are presented for the shock shape and the pressure. The behavior of the latter quantity is found to be similar to that given by the irrotational linear solution for the supersonic leading edge case. Finally, the relationship between the present application and others involving diffraction problems and corner flows is indicated.

AD-618 298 Div. 33/1
CFSTI Prices: HC$3.00 MF$0.75

Oxford Corp., Buffalo, N. Y.
IMPROVED AIRPORT GUIDANCE SIGNS.
Final rept.
13 Nov 64, 53p Rept. no. 6417
Contract FA WA4486, Proj. 422 3D
SRDS 65-31

Unclassified report

Descriptors: (*Airports, Navigational aids), (*Navigational aids, Airports), (*Inflatable structures, Navigational aids), Landing fields, Marker lights, Direction finding, Design, Performance(Engineering), Visibility.

Factors affecting the acquisition and legibility of Airport Guidance Signs were studied to determine the optimum relationship between size, height and location of the signs. The studies showed the 500-foot minimum legibility requirement to be the predominant factor in size determination with a black letter on an illuminated field to be preferable from an acquisition viewpoint. A character size of 10 inches high by 8 inches wide was chosen as satisfactory for a distance of 500 feet. Using these results, two basic types of frangible signs were developed. The first consists of an air supported plastic bag with an eighteen by-forty-eight-inch translucent illuminated field on either side of the sign. The second type uses styrofoam in place of air for the support of a similar plastic bag. Because of the light transmission and outdoor weathering requirement, a Tedlar film was chosen for the plastic on both types. A number of prototypes of each design were built and tested to demonstrate the ability of the signs to withstand a 60 MPH air load while collapsing readily when hit by an airplane section. (Author)

AD-618 309 Div. 9/6, 2/1
CFSTI Prices: HC$1.00 MF$0.50

Manchester Univ. (England). Dept. of Mechanics of Fluids.
RAREFIED GAS FLOWS BY MONTE CARLO METHODS AND UNSTEADY GAS FLOWS IN GRAVITATIONAL FIELDS.
Final rept.,
by G. A. Bird. 15 Mar 65, 10p
Grant AF EOAR64 65, Proj. 9783, Task 978302
AFOSR 65-1013

Unclassified report

Descriptors: (*Gas flow, Monte Carlo method), (*Monte Carlo method, Gas flow), (*Shock waves, Numerical analysis), Vacuum, Gravity(Artificial), Great Britain, Hypersonic flow, Aerodynamic characteristics, Turbulence, Flat plate models, Molecules, Solar atmosphere.

Methods were developed for conducting numerical experiments with a model gas in a digital computer. The methods were used to investigate the structure of strong normal shock waves, and the aerodynamic properties of simple bodies in the hypersonic transition regime. The quasi-steady equilibrium state of a shockheated atmosphere was studied with particular reference to the solar atmosphere. A method was also developed for the study of the unsteady behaviour of a heated atmosphere. (Author)

AD-618 328 Div. 9/6, 9/2
CFSTI Prices: HC$2.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
THE PSEUDO-SHOCK: A NON-LINEAR PROBLEM OF TRANSLATIONAL RELAXATION,
by B. L. Hicks. Jun 65, 37p Rept. no. R-236
Contract DA28 043AMC00073E, Proj. 20014501B31F
Unclassfied report

Descriptors: (*Shock waves, Numerical analysis), (*Relaxation time, Molecular properties), Statistical functions, Nonlinear differential equations, Integral equations, Transport properties, Molecular association, Elasticity, Monte Carlo method, Entropy, Spheres.

The Boltzmann equation was solved by Nordsieck's Monte Carlo method for the case of translational relaxation of a gas of elastic spheres whose initial velocity distribution function is given. The Mach number describes the relative separation of the two peaks of the bimodal distribution function and therefore controls the degree of initial departure from equilibrium. Calculations were made for M = 0.5, 1, 2, 4, and 6, which includes a range of initial conditions from very close to very far from thermal equilibrium. It was also shown that in a Krook model of our relaxation process, the ratio of the two collision numbers is somewhat smaller than two late in the relaxation and approaches two asymptotically.

AD-618 334 Div. 9/6, 15/1
CFSTI Prices: HC$2.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
METHOD OF CALCULATION SPATIAL TURBULENT BOUNDARY LAYER IN COMPRESSIBLE GAS,
by V. S. Avdueskii. 17 Apr 63, 26p
Rept. no. FTD-MT-63-21
TT 65-62664
Unclassified report

Edited machine trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie, n4 p3-12 1962.

Descriptors: (*Turbulent boundary layer, Compressible flow), (*Compressible flow, Turbulent boundary layer), Flat plate models, Heat transfer, Mathematical analysis, USSR.

AD-618 390 Div. 9/7
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
MIXING OF INTERSECTING TURBULENT JETS,
by I. S. Makarov and B. G. Khudenko. 14 Jul 65, 7p Rept. no. ATD-T-65-48
TT 65-62665
Unclassified report

Smeshenie Peresekayushchikhsya Turbulentnykh Struy. Trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v8 n4 p447-50 1965.

Descriptors: (*Jet mixing flow, Turbulence), Heat transfer, Nozzles, Pressure, Momentum, Velocity, USSR.

The results of experiments are given on parameters of the flow (velocity field, static pressures and temperatures) which is formed by intersection of two parallel plane turbulent jets. (Author)

AD-618 423 Div. 1/5
CFSTI Prices: HC$2.00 MF$0.50

National Aviation Facilities Experimental Center, Atlantic City, N. J. Experimentation Div.
INVESTIGATION OF A TIME-FREQUENCY TECHNIQUE FOR RANGE AND RANGE-RATE MEASUREMENTS. Final rept.,
by A. J. Mantwilla and Karl Burkard. May 65, 52p
Proj. 110 501X
FAA RD-65-54
Unclassified report

Descriptors: (*Atomic clocks, Tests), (*Warning systems, Proximity devices), Countermeasures, Aviation accidents.

A flyable breadboard device utilizing a stable atomic clock to derive range and relative closing speed of two aircraft was built by National Company, Incorporated, and was installed aboard two Federal Aviation Agency aircraft. The ratio of range and relative closing speed is used to approximate time to nearest approach (tau) for assessing collision threats. An analysis of the results indicated that the technique is a feasible method of determining range and relative closing speed (range-rate) and is applicable to assess airborne collision threats. (Author)

AD-618 460 Div. 9/7

Lincoln Lab., Mass. Inst. of Tech., Lexington.
MEASURED TRANSITION FROM LAMINAR TO TURBULENT FLOW AND SUBSEQUENT GROWTH OF TURBULENT WAKES,
by W. G. Clay, M. Labitt, and R. E. Slattery.
8 Sep 64, 5p
Unclassified report

Pub. in AIAA Journal v3 n5 p837-41 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Wake, Turbulence), (*Laminar flow, Turbulence), (*Spheres, Turbulence), Copper, Vacuum, Schlieren photography, Microwave equipment, Physical properties, Hypervelocity projectiles, Ablation, Electrons.

Turbulent transition distances and growth of turbulent wakes behind 3/16-in. copper-clad aluminum spheres traveling through rarefied air at 18,000 to 20,000 fps are presented. The data are taken by two independent methods: twin schlieren systems (optical) and a UHF microwave cavity (electronic). The turbulent transition distances are measured to several thousands of sphere diameters at the lower pressures by both methods. Turbulent wake widths are also determined by both techniques and the 1/3 power growth rate is confirmed for these velocities. (Author)

AD-618 482 Div. 9/5, 9/6, 25/8
CFSTI Prices: HC$2.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
NON-SIMILAR BOUNDARY LAYER HEAT TRANSFER OF A ROTATING CONE IN FORCED FLOW. Mathematical note,
by J. C. Y. Koh and J. F. Price. Apr 65, 30p
Rept. no. MN-410, D1-82-0433
Unclassified report

Also available from the author.

Descriptors: (*Heat transfer, Boundary layer), (*Conical bodies, Heat transfer), Rotation, Fluid flow, Heat transfer coefficients, Partial differential equations, Disks, Drag, Torque.

The problem of fluid flow and heat transfer characteristics of a cone rotating in a forced flow field is investigated. The flow problem in general involves two parameters, m and s. For heat transfer, one additional parameter, Pr, must be considered. For the special case of a

rotating disk in forced flow, the partial differential equations are reduced to a set of ordinary differential equations with two parameters s and Pr. The non-similar boundary layer flow equations are solved for two half cone angles (alpha = 90 degrees and 53.5 degrees) for various Prandtl numbers with s ranging from 0 to about 20. It was found that for s = 10, the first order approximation from the power expansion scheme may not be sufficient. (Author)

AD-618 493 Div. 1/5
CFSTI Prices: HC$3.00 MF$0.75

Aviation Safety Engineering and Research, Phoenix, Ariz.
CARGO RESTRAINT CONCEPTS FOR CRASH RESISTANCE.
Final technical rept.,
by James P. Avery. Jun 65, 62p Rept. no. AvSER-64-13
Contract DA44 177AMC116T, Task 1A024701A12101
USAAML TR-65-30

Unclassified report

Descriptors: (*Aviation safety, Cargo), (*Cargo, Safety harness), (*Transport planes, Safety harness), Airframes, Design, Nets, Nylon, Steel, Acceleration, Computers, Simulation, Helicopters.

The report covers an investigation of three cargo restraint concepts: (1) an extensible-net-type restraint (such as a nylon net) secured directly to the airframe, (2) the same extensible net attached to load limiters (attenuators), and (3) an inextensible-net-type restraint (such as a steel net) attached to load limiters. Each concept was investigated analytically using computer simulation to determine the dynamic performance of the system under the action of crash acceleration pulses. Drop tests were also conducted to verify analyses. General comparisons were made to obtain the advantages and shortcomings of each restraint concept as well as the influence of controllable parameters. A substudy of the nature of the probable crash induced acceleration pulse was also undertaken. This led to a proposed standard pulse for cargo restraint design purposes. (Author)

AD-618 527 Div. 1/1, 8/7
CFSTI Prices: HC$3.00 MF$0.75

LTV Vought Aeronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
INVESTIGATION OF CONTACTLESS SWITCHING CONCEPTS FOR APPLICATION TO AIRCRAFT ELECTRICAL SYSTEMS. VOLUME V. INVESTIGATION OF MULTIPLE SIGNAL GENERATION, TRANSMISSION, AND DETECTION.
Final engineering rept. phase 5, 20 Jun 63-20 Aug 64,
by W. M. Drum and J. L. Jones. 20 Aug 64, 71p
Rept. no. 2-53727/4R449-5
Contract NOw63 0515c

Unclassified report

Descriptors: (*Multiplex, Control systems), (*Aircraft equipment, Control systems), Circuits, Multipath transmission, Signal generators, Multiple operation, Signals, Decoding.

A study program was conducted to establish system requirements and circuit concepts for accomplishing multiple signal generation, transmission, and detection in conjunction with the utilization of the contactless switching system in an aircraft electrical system. Several system concepts were developed, subjected to theoretical analyses, and found to meet the requirements established for the multiple signal system. Problem areas expected with regard to the proposed concepts were discussed, and the compatibility of these concepts with the contactless switching system and with aircraft control functions was considered. It was concluded that a multiple signal system is quite possible, but further investigation is needed before the practicality of such a system could be determined. (Author)

AD-618 635 Div. 33/1, 16/10, 6/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EVALUATION OF WORKING CONDITIONS OF CIVILIAN AIRPORT RADAR INSTALLATIONS,
by A. Ya. Loshak and E. F. Marechkin. 14 Jul 65, 17p Rept. no. FTD-TT-65-345
TT 65-62699

Unclassified report

Unedited rough draft trans. of Gigiena i Sanitariya (USSR) v29 n7 p39-44 1964.

Descriptors: (*Microwaves, Radiobiology), (*Airport radar systems, Hazards), (*Radar operators, Hazards), (*Radiobiology, Radar equipment), Airports, Air traffic controllers, Electronic technicians, Radar antennas, Safety, USSR.

The engineering and technical staff of the radar stations in civilian aviation are subjected to the action of direct and diffused, discrete, and often almost constant, or intermittent pulse-type UHF radiation the level of which can be from units of micro w/sq cm 2 up to several micro w/sq cm. The prevention of the harmful effect of microwaves on the personnel of the radar stations should be based in the first place on planned and organized measures and afterwards further on the use of protecting media. It is necessary to develop norms for allowable radiation taking into account the periodicity, intensity, and frequency range of the acting UHF energy. The high levels of UHF radiation recorded from the radar antennas require the establishment of zones of sanitary protection and the development of methods of theoretical computation and dosimetric determination of their magnitudes. (Author)

02. Agriculture

AD-618 145 Div. 32/1, 16/4

Prairie Regional Lab., Saskatoon (Saskatchewan).
AMINO ACID RECOVERIES IN THE ANALYSES OF SOME FEED SAMPLES,
by A. J. Finlayson. 30 Nov 64, 5p
NRC 8392

Unclassified report

Pub. in Canadian Journal of Plant Science v45 p184-8 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Wheat, Amino acids), (*Amino acids, Wheat), Oils, Hydrolysis, Methionine, Canada.

Amino acid analyses were made on a sample of rapeseed following oil extraction and on a sample of ground wheat. The analyses show there are hydrolytic losses of threonine, serine, cystine, and methionine which increase with the length of time of hydrolysis of the feed. Recoveries of certain amino acids from feeds depend on the conditions of hydrolysis and hence, for purposes of comparions of amino acid analyses, hydrolysis conditions should be standardized. (Author)

03. Astronomy and Astrophysics

AD-618 222 Div. 2/1
CFSTI Prices: HC$1.00 MF$0.50

Oslo Univ. (Norway). Dept. of Astrophysics.
RESEARCHES IN SOLAR PHYSICS DURING 1964.
Scientific rept.,
by Svein Rosseland. 30 Jan 65, 25p Rept. no. SR-1
Contract AF61 052 743
AFCRL 65-363

Unclassified report

Descriptors: (*Solar disturbances, Astrophysics), (*Solar radiation, Very high frequency), Sunspots, Magnetic storms, Magnetic fields, Solar flares, Radio astronomy, Solar spectrum, Norway.

The structure of storm bursts in the meter wave region, and their interrelations were studied. Individual bursts in a 'shower' appear to be independent of each other. Occasional bursts sometimes show an approach to regular periodicity, but irregular distributions of bursts are more common. Studies of the band 310 - 340 mc showed very few bursts which might be ascribed to a solar origin. A comparison of meter wave observations of the sun at Oslo with NERA (The Netherlands) and Tokyo indicates that the Oslo data have a high degree of reliability and stability, even over a 10 year period. Some progress is reported in a study of the new type of bursts named 'flash-bursts'. A study of the lifetime of sunspot groups and of magnetic properties of sunspot groups led to the discovery of several new tendencies of the sun to display secular variations, different from one cycle to the next. The transparency properties of sunspot models are discussed. Some current models fail to stand up to the test in this respect. The continuation of Maltby's work on Evershed effect and wiggles was continued with fair success, in spite of the low solar activity. In this connection Brahde made a theoretical study of the instrumental width of spectral lines taken with the large spectrograph of the solar tower. (Author)

AD-618 231 Div. 2/1, 20/2

Montana State Coll., Bozeman.
APPROACH TO EQUILIBRIUM IN THE CNO BI-CYCLE.
Revised ed.,
by Georgeanne R. Caughlan. 25 Sep 64, 36p
Contract Nonr22047; Grant NASA NGR05 002 028
N64 33125

Unclassified report

Pub. in Astrophysical Journal v141 n2 p688-717
Feb 15 1965 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 16 Jul 64.

Descriptors: (*Astrophysics, Thermonuclear reactions), (*Thermonuclear reactions, Stars), (*Stars, Thermonuclear reactions), Abundance, Nitrogen, Oxygen, Carbon, Nuclei, Protons, Hydrogen, Combustion, Chemical equilibrium, Differential equations.

Differential equations of the CNO bi-cycle are solved to obtain the abundances of carbon, nitrogen, and oxygen nuclei as functions of protons consumed per initial nucleus for hydrogen burning in the temperature range 10-50 X 1,000,000 K. General features of the curves of abundance ratios for C12, C13, N14, N15, and O16 nuclei as functions of protons consumed are found to be insensitive to the temperature at which the reactions take place. The resonance at 65 keV in the O17(p, alpha)N14 reaction is responsible for the temperature dependence of ratios involving O17 nuclei. Analysis is made of the effect of convection with microscopic mixing on CN material passing through a hydrogen-burning zone. If a simple linear relationship or a sinusoidal relationship is assumed for the time dependence of temperature, the ratios of abundances attained at the surface in a given time are the same whether the time is spent in a single transit to the surface or in several transits back and forth from the bottom of the hydrogen-burning zone to the surface of the star. (Author)

AD-618 242 Div. 2/1

Oslo Univ. (Norway). Inst. of Theoretical Astrophysics.
ON THE VELOCITY FIELD IN SUNSPOTS.
Scientific rept.,
by Per Maltby. 1964, 69p Rept. no. SR-25(47)
Contract AF61 052 186
AFCRL 65-424

Unclassified report

Pub. in Astrophysica Norvegica v8 n8 p205-69 1964
(Copies available only to DDC users). Presented to the Academy in the session of October 25, 1963 by Rosseland).

Descriptors: (*Sunspots, Celestial mechanics), (*Astrophysics, Sunspots), Solar atmosphere, Solar spectrum, Deformation, Motion, Velocity, Spectroscopy.

Using the tower telescope of the Oslo Solar Observatory approximately 4600 spectra from 62 different sunspots have been obtained. From the study of weak Fraunhofer lines the velocity fields in isolated spots and sunspot groups have been derived. For the isolated spots the radial velocity component directed horizontally out of the spot is found to be the largest in most cases, but appreciable tangential velocities are present. An upper limit equal to 0.15 km/sec is found for the vertical velocity component. Sunspot groups show a higher frequency of tangential velocities as well as a faster change in the velocity field with time than is the case for isolated spots. An abrupt change in velocity at the outer prenumbral rim is detected. The observed line profiles when Evershed velocities are present have been discussed. A comparison between observed and calculated line profiles shows that the velocity changes much more quickly with optical depth than previously assumed. A discussion of the continuity of the motion shows that the vertical velocity component may be small since the density increases rapidly with depth as compared with the increase in horizontal velocity with increasing distance from the spot centre. (Author)

AD-618 256 Div. 2/1

Office of Research Analyses, Holloman AFB, N. Mex.
SUN'S MOTION AND SUNSPOTS.
Final rept.,
by Paul D. Jose. 29 Sep 64, 11p Rept. no. ORA-65-2

Unclassified report

Pub. in Astronomical Journal v70 n3 p193-200
Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sun, Celestial mechanics), (*Celestial mechanics,Sun), (*Sunspots, Celestial mechanics), (*Astrophysics, Sunspots), Planets, Solar systems, Momentum, Astronomical data.

The investigation discloses thatthe variation in the motion of the sun about the center of mass of the solar system has a periodicity of 178.7 yr. The sunspot cycle is found to have the same period. Although the oscillations in the sunspot numbers and in the sun's motion are not in perfect agreement, the few departures that do occur, occur under very similar conditions. (Author)

AD-618 261 Div. 2/1

Instituto de Neurologia, Montevideo (Uruguay).
CONVECTION AND THE DIFFERENTIAL ROTATION OF THE SUN,
by N. O. Weiss. 1965, 3p
Grant AF AFOSR312 63

Unclassified report

Pub. in The Observatory v85 n944 p37-9 Feb 1965
(Copies available only to DDC users).

Descriptors: (*Astrophysics, Sun), (*Sun, Fluid dynamic properties), Solar atmosphere, Convection, Rotation, Celestial mechanics, Thermodynamics, Magnetohydrodynamics.

Criteria for estimating the superadiabatic temperature gradient required to produce a given convective energy flux in a rotating solar convective zone are discussed. It appears that, although the effect of rotation is negligible in the photosphere, it may double the superadiabatic gradient in the deep convective zone. Consequently, if convective heat transport is the same at the poles as at the equator of the Sun, the polar regions should be cooler by an amount of order 20K.

AD-618 360 Div. 2/1
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ECLIPSE OBSERVATIONS FROM THE MOON AND CISLUNAR SPACE,
by G. F. Schilling and R. C. Moore. Jul 65, 22p
Rept. no. P-3130

Unclassified report

Prepared for presentation at the Lunar International Laboratory Symposium, Astronautical Congress (16th), Athens, Greece, 16 Sep 65.

Descriptors: (*Moon, Astronomical observatories), (*Solar eclipses, Lunar bases), Earth, Astronomy, Astrophysics, Spacecraft.

Observing eclipses of the sun and earth from the moon will present unique opportunities for performing valuable scientific experiments. Even during the early phases of lunar exploration, such observational data can be obtained most easily, efficiently, and economically by human observers using very simple instruments. It should be noted that a coordinated program of simultaneous eclipse observations from the earth, from the moon, and from orbiting manned spacecraft, would produce a wealth of scientific data for studies in solar physics, geophysics, astronomy, meteorology, relativity theory, and other fields. Inadequacies in present eclipse theories, unfortunately, do not permit rigorous solutions for the luminous characteristics of the eclipsing and eclipsed bodies as they would appear to observers on the moon or in cislunar space. Nevertheless, quantitative data on the brightness of the earth's halo at specific distances from within the terrestrial shadow-cone have been obtained by a novel method that combines refraction and multiple scattering theory with observed twilight phenomena. (Author)

AD-618 545 Div. 2/1, 30/2
CFSTI Prices: HC$4.00 MF$0.75

Texas Univ., Austin.
A SOLAR SYSTEM EPHEMERIS FOR 1950 TO 2000.
Masters' thesis,
by James Roger Clark. May 65, 102p

Unclassified report

Descriptors: (*Solar systems, Celestial mechanics), (*Celestial mechanics, Programming(Computers)), (*Programming(Computers), Celestial mechanics), Velocity, Planets, Moon, Mercury(Planet), Venus, Mars, Jupiter, Saturn, Uranus, Pluto.

Three computer programs were written to provide a means of using the available ephemeris data in numerical studies of the motions of celestial bodies. These programs are written in Fortran 63 language for use on the Control Data Corporation 1604. The main program PHEMERIS is an interpolation subroutine which provides the user with rectangular coordinates and rectangular components of the velocity of any one or all of the major bodies of the solar system. The information may be obtained in a coordinate system referenced to mean equinox and equator of 1950 or to the equinox and ecliptic of 1950. The reference frame may be centered in the Sun, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Moon, or at the Earth-Moon Barycenter. The nutation and nutation rate in longitude and obliquity are made available. The information may be obtained for any time point between 30 December 1949 and 5 January 2000 with an accuracy of 12 figures. (Author)

AD-618 666 Div. 2/1, 24/2, 2/4
CFSTI Prices: HC$2.00 MF$0.50

Holman (John F.), Co., Inc., Washington, D. C.
SURVEY OF CELESTIAL BODIES, PHOTOGRAMMETRY AND INTERPRETATION OF PHOTOGRAPHS DURING COSMIC INVESTIGATIONS,
by G. B. Gonin. Aug 65, 28p
Contract DA44 009AMC930T, Proj. 4A623 501D853
AERDL T-1793-65; TT 65-62720

Unclassified report

Trans. of mono. Syemka Nebesnykh tel, Fotogrammetriya i Deshifrirovanie Snimkov pri Kosmicheskikh Issledovaniyakh. Spetsialnye Voprosy Fotogrammetrii, Moscow, 1964 p5-20.

Descriptors: (*Photographic techniques, Space probes), (*Astronomy, Photographic techniques), (*Space probes, Photographic techniques), Photogrammetry, Photointerprelation, Aerial photography, Celestial mechanics, Reviews.

The report discusses the photography of celestial bodies of the solar system from rockets, interplanetary stations and artificial satellites, cosmic mapping, photogrammetry and the interpretation of photographs obtained in cosmic space.

04. Atmospheric Sciences

AD-617 948 Div. 2/1, 20/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
TRANSPORT OF RADIOACTIVE AEROSOLS IN THE TROPOSPHERE FROM THE NORTHERN TO THE SOUTHERN HEMISPHERE,
by Yu. V. Krasnopevtsev. 9 Jul 65, 13p
Rept. no. FTD-TT-65-342
TT 65-62620

Unclassified report

Unedited rough draft trans. of Meteorologiya i Gidrologiya (USSR) n4 p3-8 1964.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Atmospheric motion, Tracer studies), (*Troposphere, Air mass analysis), (*Radioactive fallout, Air mass analysis), (*Aerosols, Radioactive fallout), Nuclear explosions, Radioactivity, Wind, Transport properties, Northern Hemisphere, Southern Hemisphere, Meteorology, USSR.

In this article an attempt is made to evaluate the rate of transition through the equatorial zone of radioactive aerosols formed as a result of nuclear explosions in the Northern Hemisphere.

AD-617 996 Div. 2/1

Saskatchewan Univ. (Saskatoon).
OPTICAL MEASUREMENTS OF AURORAS.
Scientific rept.,
by A. Vallance Jones. 1964, 25p
Rept. no. SR-DR-6
Contract AF19 628 2869, Proj. 7661, Task 766102
AFCRL 64-440

Unclassified report

Pub. in Auroral Phenomena, Experiments and Theory p19-38 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Auroras, Optical analysis), Solar wind, Solar radiation, Hydrogen, Upper atmosphere, Atmospheric temperature, Spectroscopy, Geophysics.

Information which has been obtained by optical spectroscopic observations of aurora is reviewed. Type A red aurora, type B red aurora, polar cap glow, sunlit rays, daylight aurora, proton aurora and normal aurora are discussed and distinguished. Methods of measuring upper atmospheric temperature from auroral spectra are reviewed. There is a discussion of the information obtained from auroral hydrogen emissions both in relation to the characteristics of the incoming proton fluxes and the relation of these fluxes to the zones of electron precipitation which give rise to the brighter parts of auroral displays. Finally, information obtained recently about the lifetimes of metastable states and the time characteristics of the incoming particle fluxes from high-time resolution measurements are considered. (Author)

AD-618 054 Div. 2/7
CFSTI Prices: HC$1.00 MF$0.50

Queen's Univ., Belfast (Northern Ireland). Dept. of Applied Mathematics.
ELECTRON TEMPERATURES IN THE D REGION,
by A. Dalgarno and R. J. W. Henry. 1965, 23p
AFCRL 65-482

Unclassified report

Descriptors: (*Electrons, Temperature), (*Ionosphere, Electron density), Plasma physics, Excitation, Energy, Electron transitions, Elastic scattering.

Detailed estimates are made of the rates of energy loss of electrons moving in the D region and it is argued that the electron gas has a negligible non-thermal component. The Maxwellian velocity distribution of the thermal component is brought about by collisions with molecular nitrogen involving rotational transitions and the distribution is determined by the neutral particle gas temperature. (Author)

AD-618 091 Div. 2/7, 20/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DETERMINATION OF THE EFFECTIVE COLLISION FREQUENCY IN THE IONOSPHERE,
by V. D. Gusev. 13 Jul 65, 8p
Rept. no. FTD-TT-65-101
TT 65-62648

Unclassified report

Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya Matematiki, Mekhaniki, Astronomii, Fiziki, Khimii (USSR) v14 n1 p105-8 1959.

Descriptors: (*Atmospheric sounding, Electron density), (*Electron density, Ionosphere), (*Ionosphere, Electron density), Nuclear reactions, Probes(Electromagnetic), Radio waves, Ionospheric propagation, USSR.

AD-618 101 Div. 2/7, 30/4, 20/6
CFSTI Prices: HC$4.00 MF$0.75

General Dynamics/Fort Worth, Tex. Nuclear Aerospace Research Facility.
ATMOSPHERIC DIFFUSION STUDIES AT THE NARF SITE.
Rept. for 1 Oct 63-30 Sep 64,
by H. G. Bradbury. Jun 65, 113p Rept. no. FZK-206
Contract AF29 601 6213, Proj. 6773, Task 677305
WL TR-64-156

Unclassified report

Descriptors: (*Atmosphere, Diffusion), (*Diffusion, Atmosphere), (*Air pollution, Radioactivity), (*Radiological contamination, Atmosphere), Micrometeorology, Transport properties, Nuclear physics laboratories, Nuclear reactors, Reactor hazards, Reactor safety systems, Health physics, Tracer studies.

Four atmospheric diffusion experiments were conducted in the Nuclear Aerospace Research Facility area at General Dynamics/Fort Worth in order to study the dispersal and dilution factors of the atmosphere as they pertain to the release of airborne radioactivity in the NARF area. Fluorescent dye was released to the atmosphere from a point near the Reactor Operations Building and sampled downwind to measure depletion factors under varying meteorological conditions. The tests were performed with air temperature gradients ranging from slightly unstable to mildly stable (inversion) situations. The sampling data obtained were applied in the evaluation of the parameters associated with the statistical diffusion equation. Although the four tests were too few in number to provide substantial statistical data, the results show that under the poorest diffusion conditions experienced, the effluent depletion factors ranged from approximately 0.0001 to 0.000001 between 88 and 704 m from the release

point. These factors are considerably less than those actually being applied under nuclear safety considerations within the NARF reactor operations area. (Author)

AD-618 118 Div. 2/7, 8/6, 2/6
CFSTI Prices: HC$4.00 MF$1.00

Massachusetts Inst. of Tech., Cambridge.
TWO-DIMENSIONAL CALCULATIONS OF MAGNETIC MICROPULSATION RESONANCES.
Doctoral thesis,
by Roy Jay Greenfield. 21 Jun 65, 147p
Proj. NR371 401
Unclassified report

Descriptors: (*Magnetic resonance, Ionospheric propagation), (*Ionospheric propagation, Magnetic resonance), (*Atmosphere models, Magnetic resonance), Terrestrial magnetism, Electromagnetic fields, Electron density, Plasma physics, Geophysics, Difference equations.

Magnetic micropulsations in the period range of 5 to 45 seconds have been interpreted as a resonant amplification of waves in the ionosphere. The wave involved is of the type which is not guided by the earth's magnetic field. A resonance can occur, because the wave energy is trapped by the rapid increase with height of the Alfven wave velocity above the F2 peak. Previous theoretical investigations of this resonance have been limited to models for the ionosphere in which the properties could only vary with height and not with horizontal position. This study considers the effect of horizontal variations, by examining the solutions of two-dimensional models. The first model simulates longitude independent propagation in a spherical earth-ionosphere. The horizontal variation is introduced by the inclusion of a dipole magnetic field. The second model is a cylindrical model. In this model the ionospheric parameters, such as the electron density, vary with the angular coordinate. Both two-dimensional models were solved by the use of finite difference methods.

AD-618 167 Div. 4/3, 25/7

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
LOCALIZATION OF THE C=Se VIBRATION IN THE INFRARED SPECTRA OF SELENOSEMICARBAZONES,
by B. A. Gingras, T. Suprunchuk, and C. H. Bayley.
4 Jan 65, 8p Rept. no. NRC-8362
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1650-5 1965 (Copies available only to DDC users).

Descriptors: (*Selenium compounds, Spectra(Infrared)), (*Organic nitrogen compounds, Spectra(Infrared)), (*Infrared spectroscopy, Selenium compounds), Ketones, Chemical bonds, Band spectrum, Copper compounds, Complex compounds, Canada.

Few organic compounds of selenium are known and, consequently, very little published data are available concerning the various vibrations around the selenium atom. The paper discusses the C=Se vibration in selenosemicarbazones by comparing their infrared spectra with those of corresponding Se-benzyl derivatives in which the C=Se group has been replaced by a C-Se-Bz. On this basis, it can be seen that a band at 800-780 cm in the spectra of selenosemicarbazones is absent in the spectra of the benzyl derivatives. This band is assigned to the C=Se vibration. (Author)

AD-618 171 Div. 2/7, 12/1

American Science and Engineering, Inc., Cambridge, Mass.
MEASUREMENTS IN THE RADIATION BELTS FROM HITCH-HIKER I,
by F. R. Paolini, R. Giacconi, J. R. Waters, L. Katz, and D. Smart. 1964, 31p
Contract AF19 628 2392, Proj. 8600, Task 860006
AFCRL 65-377; AFCRL ERP-106
Unclassified report

Pub. in Space Research V. Proceedings of the International Space Science Symposium (5th), Florence, May 8-20, 1964 (Copies available only to DDC users).

Descriptors: (*Scientific satellites, Van Allen radiation belts), (*Van Allen radiation belts, Satellites(Artificial)), (*Radiation measurement systems, Van Allen radiation belts), Protons, Electrons, Upper atmosphere, Instrumentation, Symposia.

The Air Force sub-satellite Hitch-hiker I was launched into an elliptical polar orbit on 1 July 1963. The satellite carried a payload which included six radiation detection instruments for simultaneously investigating the energy spectra and angular distributions of protons and electrons in the Earth's magnetosphere over a broad range of energies. Data from an orbit of 4 July show qualitative differences in the structures of the radiation belts defined by the different energy bands investigated. Electrons of energies greater than 4 MeV (as detected by a Geiger counter) define two distinct zones with hearts at L = approx. 1.6 and L = approx. 4.5, with a pronounced slot between them at L = approx. 3.0. Electrons of energies between 1 and 4 MeV behave similarly. Protons of energies between 1 and 4 MeV are also found to lie in two zones, congruent with the electron zones, but with the outer one not so well pronounced. Electrons of energies between 15 and 100 keV define a single zone, extending beyond L = approx. 6.9, and with a heart around L = approx. 1.6. Differential spectra of electrons from 15 to 100 keV, measured with a 15% resolution, exhibit maxima around 40 keV over an extensive region of the magnetosphere, L <4, but monotonically decrease from 15 keV in regions beyond L = approx. 4. (Author)

AD-618 206 Div. 2/7
CFSTI Prices: HC$7.00 MF$2.00

Naval Research Lab., Washington, D. C.
DATA FROM A SYSTEM OF ATMOSPHERIC ELECTRICITY STATIONS.
Interim rept.,
by Eva Mae Trent and R. V. Anderson. 20 May 65, 400p Rept. no. NRL-6162
Proj. 71A02 15, Task FASS00 006 652 1 F003 02 04
Unclassified report

Descriptors: (*Atmospheric electricity, Data), Automatic, Weather stations, Naval research laboratories, Newfoundland(Province), New Jersey, Virginia, Florida, Atmosphere, Electrical properties, Meteorological parameters, Meteorological phenomena, Tables, Graphics.

Semiautomatic Atmospheric Electricity Stations were installed at Naval Air Stations in Argentina, Newfoundland; Lakehurst, New Jersey; Norfolk, Virginia; and Pensacola, Florida. These stations were instrumented to provide recordings of both polar conductivities and of electric field. The data are presented in tabular form listing daily, hourly averages of total conductivity, ratio of the two polar conductivities, potential gradient, and selected weather observations taken from WBAN reports. The tables list data for the period between installation and December 1, 1961. Graphs of seasonal hourly averages of conductivity in fog and in fair weather are presented. (Author)

AD-618 213 Div. 2/7, 8/6
CFSTI Prices: HC$3.00 MF$0.50

Ionosphere Research Lab., Pennsylvania State Univ., University Park.

THE MEASUREMENT OF PHASE AND AMPLITUDE RADIO WAVE INTERACTION AT UNIVERSITY PARK, PENNSYLVANIA, FOR JANUARY-FEBRUARY-MARCH, 1965.
Scientific rept.,
by A. J. Ferraro and H. S. Lee. 30 May 65, 52p
Rept. no. SR-239
Contract AF19 628 4014, Grant NSF GP846, Proj. 8605, Task 860502
AFCRL 65-420

Unclassified report

Descriptors: (*Luxemberg effect, Atmospheric sounding), (*Atmospheric sounding, Luxemberg effect), (*Radio waves, Ionospheric propagation), (*Ionospheric propagation, Radio waves), Phase measurement, Ionosphere, Electrons, Excitation, Radiofrequency interference, Radiofrequency spectroscopy, Geophysics.

The objective of the present work is to study the properties of ionospheric D-region using radio wave interaction effect which is also commonly known as Luxembourg effect. The present technique closely follows that developed by Fejer (Atmosp. Terr. Phys. 7:322 (1955)) for radio wave amplitude interaction experiment. However, the technique of measurement as well as the theory of radio wave interaction have been extended and generalized at the Ionosphere Research Laboratory by the introduction of complex coefficient of interaction T, to embody the effect of interaction on both the amplitude and the phase of radio waves.

AD-618 246 Div. 2/7

Air Force Cambridge Research Labs., Bedford, Mass.
OXYGEN ATOM DETERMINATION IN THE UPPER ATMOSPHERE BY CHEMILUMINESCENCE OF NITRIC OXIDE.
Environmental research papers (Revised ed.),
by Dan Golomb, N. W. Rosenberg, Carol Aharonian, J. A. F. Hill, and H. L. Alden. 4 Dec 64, 26p
Rept. nos. AFCRL-65-378, ERP-107
Proj. 7635, Task 763501

Unclassified report

Pub. in Journal of Geophysical Research v70 n5 p1155-73 Mar 1 1965 (Copies not available to DDC or Clearinghouse customers). Prepared in cooperation with Mithras, Inc., Cambridge, Mass.

Descriptors: (*Oxygen, Determination), (*Upper atmosphere, Oxygen), (*Luminescence, Upper atmosphere), (*Nitrogen compounds, Oxides), Rockets, Condensation trails, Chemical reactions, Light, Intensity, Photons, Emissivity, Photographic analysis, Atoms, Shock waves.

Atomic oxygen density profiles in the 90-140 km altitude region have been obtained by analyzing the radiation intensity of chemiluminous nitric oxide trails deposited by rockets into the upper atmosphere. The trails consist of a very bright headglow and a dimmer afterglow. The headglow is believed to originate in the mixing zone around the NO jet expanding into the atmosphere. A gasdynamic model is given defining the reaction volume and time for the NO-O reaction in the headglow. Oxygen atom densities are evaluated by applying the gasdynamic model to the radiation intensity of the headglow. The resulting altitude profiles indicate maximum oxygen atom densities in the 103-107 km region. (Author)

AD-618 286 Div. 2/7, 25/7

University of Western Ontario, London. Dept. of Physics.
TRANSITION PROBABILITIES OF AERONOMICALLY IMPORTANT SPECTRA,
by R. W. Nicholls. 14 Dec 63, 39p
Contract AF19 628 2820; Grant AF AFOSR62 236, Proj. 9768, Task 976801
AFOSR 65-1089

Unclassified report

Pub. in Annales de Geophysique v20 n2 p144-81 Apr-Jun 1964 (Copies available only to DDC users).

Descriptors: (*Atmosphere, Luminescence), (*Luminescence, Atmosphere), Aurorae, Sky brightness, Atomic spectroscopy, Molecular spectroscopy, Spectra-(Visible + Ultraviolet), Electron transitions, Atomic energy levels, Atmospheric sounding, Geophysics.

Atomic and molecular radiative transitions which are important in aeronomy are reviewed. The various transition probability parameters of atomic and molecular spectra are defined and the currently available values of transition probabilities of the aeronomical spectra are displayed in tables. (Author)

AD-618 292 Div. 2/7
CFSTI Prices: HC$2.00 MF$0.50

Friez Instrument Div., Bendix Corp., Baltimore, Md.
FURTHER DEVELOPMENT OF THE AN/DMQ-9 ROCKETSONDE.
Final rept. for Apr 64-Apr 65,
by K. W. Kidd. Jun 65, 30p Rept. no. IER-630
Contract AF19 628 4045, Proj. 6682, Task 668206
AFCRL 65-458

Unclassified report

Descriptors: (*Sounding rockets, Atmospheric sounding), (*Atmospheric sounding, Sounding rockets), Atmospheric temperature, Meteorological instruments, Meteorological parameters, Upper atmosphere, Transponders, Flight tests, Winds, Telemeter systems, Parametric amplifiers.

The AN/DMQ-9 rocketsonde is an expendable meteorological instrument package designed for use with the Arcas rocket vehicle to obtain vertical profiles of temperature and winds in the upper atmosphere between 80,000 feet and 200,000 feet. The instrument is of the transponder type and is compatible with the AN/GMD-2 Rawin Set ground equipment. The purpose of this effort was to up-grade the existing design to provide for improved flight performance and ease of handling in the field. Flight tests conducted at the Air Force Eastern Test Range, Cape Kennedy, Florida indicate that the resulting instrument package is suitable for field use when the Rawin Set is supplemented with a parametric amplifier. (Author)

AD-618 301 Div. 2/7
CFSTI Prices: HC$2.00 MF$0.50

University Coll., London (England).
DETERMINATION OF AIR DENSITY, TEMPERATURE AND WINDS AT HIGH ALTITUDES.
Annual summary rept. no. 1,
by R. W. Procunier, G. V. Groves, and D. P. McDermott. 1 Mar 65, 48p Scientific rept. no. SR-2
Contract AF61 052 781
AFCRL 65-432

Unclassified report

Descriptors: (*Atmospheric sounding, Meteorological parameters), (*Meteorological parameters, High altitude), Winds, Turbulence, Acoustics, Atmospheric temperature, Density, Explosion effects, Grenades.

Part I reviews the following subjects: (i) the acoustical detection of signals from grenade releases above 85 km altitude; and (ii) the development of the theory of acoustical

propagation through the atmosphere for the purpose of grenade burst position triangulation. Part II discusses infrasonic effects of atmospheric turbulence. Part III examines acoustic determination of grenade burst positions up to 30 km altitude.

AD-618 305 Div. 2/7, 8/6, 30/3
CFSTI Prices: HC$3.00 MF$0.75

Lowell Technological Inst. Research Foundation, Mass.
DEVELOPMENT OF SPECIALIZED RADIO RECEIVING APPARATUS, FREQUENCY CONTROL AND DATA RECORDING APPARATUS.
Final rept. for 1 Feb 61-31 Oct 64,
by Klaus Bibl, Harriet Allen, and Gary Sales. Feb 65, 70p
Contract AF19 604 8371, Projs. 7663, 4603,
Task 766307, 460309,
AFCRL 65-261

Unclassified report

Descriptors: (*Ionosphere, Electron density), (*Ionospheric propagation, Statistical analysis), Satellites(Artificial), Radio beacons, Monitors, Dopple effect, Magneto-optic effect, Scintillation counters, Measurement, Data processing systems, Radio signals, Attenuation, Correlation techniques, Ionization.

Satellite signal reception is used to study the small and large local irregularities and time variation of total electron content in the ionosphere. Methods of simultaneously tracking different phase-locked frequencies at different locations are described insofar as they are related to precise measurements of amplitude and phase of signals which are propagated through the ionosphere. Detailed instruction of the system is given in a separate manual. Basic formulas are developed for interpretation of Faraday, dispersive Doppler and incidence angle measurements under the assumption of a curved earth and a curved ionosphere with local gradients in ionization. Contribution of curvature and ionization gradients is shown to be more important for computation of total electron content than high order approximation of the magnetic field. Theoretical investigations try to join different statistical approaches for the purpose of scintillation and drift measurements. Usefulness of a logarithmic amplitude scale for statistical analysis can be shown. Contribution in maintenance of a riometer network is also reported. (Author)

AD-618 307 Div. 2/7
CFSTI Prices: HC$5.00 MF$1.00

Reiter (Reinhold) (Germany).
BEHAVIOR OF ATMOSPHERIC ELECTRIC MAGNITUDES RECORDED SIMULTANEOUSLY AT SEVEN MOUNTAIN STATIONS BETWEEN 700 AND 3000 METRES ABOVE SEALEVEL. RESULTS OF ANALYSIS OF THE FINE AND THE DISTRUBED WEATHER DATA, WITH SPECIAL ATTENTION BEING GIVEN TO PRECIPITATION AND ITS NITRATE AND NITRITE ION CONTENTS, VOLUME I.
Technical rept.,
by Reinhold Reiter. Jul 58, 171p
Contract AF61 514 949
AFCRC TN-58-645 V1

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Atmospheric electricity, Records), (*Atmospheric precipitation, Analysis), (*Nitrates, Atmospheric precipitation), (*Nitrites, Atmospheric precipitation), Weather stations, West Germany, pH, Thunderstorms, Weather forecasting.

By means of a station network built up in the Wetterstain Mountains (Northern Alps), Continuous recordings of atmospheric electric elements were carried out during all seasons and weather conditions. The seven stations are situated at different altitudes between 700 and 3000 m above sealevel, their horizontal distances being relatively small. The potential gradient was recorded at each of the stations, the air earth current of four of them. Besides, point discharge current, spherics, and the number of positive and negative small ions were recorded at one of the stations. The positive and negative conductivity of the air was measured through several hours at each station from time to time in fine weather. The nitrite and nitrate ion contents as well as the pH value of each precipitation were determined; the samples were collected separately for each precipitation or, in the cases of longer precipitation, for several hours, and that at one of the valley stations, if possible simultaneously also at a neighbouring peak station.

AD-618 308 Div. 2/7
CFSTI Prices: HC$5.00 MF$1.00

Reiter (Reinhold) (Germany).
BEHAVIOUR OF ATMOSPHERIC ELECTRIC MAGNITUDES RECORDED SIMULTANEOUSLY AT SEVEN MOUNTAIN STATIONS BETWEEN 700 AND 3000 METRES ABOVE SEALEVEL. RESULTS OF ANALYSIS OF THE FINE AND THE DISTURBED WEATHER DATA, WITH SPECIAL ATTENTION BEING GIVEN TO PRECIPITATION AND ITS NITRATE AND NITRITE ION CONTENTS, VOLUME II.
Technical rept.,
by Reinhold Reiter. Jul 58, 178p
Contract AF61 514 949
AFCRC TN-58-645 V2

Unclassified report

See also AD-618 307.

Descriptors: (*Atmospheric electricity, Records), (*Atmospheric precipitation, Analysis), (*Nitrates, Atmospheric precipitation), (*Nitrites, Atmospheric precipitation), West Germany, Tables, Graphics, Weather forecasting.

The weather behaviour of atmospheric electric potential gradient and air earth current is given for seven stations in the Wetterstein Mountains.

AD-618 348 Div. 2/7

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
ENERGY SPECTRUM OF ELECTRONS AT LOW ALTITUDES.
Revised ed.,
by W. L. Imhof and R. V. Smith. 16 Feb 65, 6p
Contract DA49 146XZ205

Unclassified report

Pub. in Journal of Geophysical Research v70 n9 p2129-34 May 1 1965. Revision of manuscript submitted 29 Oct 64 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electrons, Low altitude), (*Van Allen radiation belt, Electrons), Energy, Distribution, Beta-Ray spectrum, Scientific satellites, Scintillation counters, Pulse height analyzers.

Electron energy spectrum measurements were made

in October-November 1963 from a polar orbiting satellite with an apogee of 355 km and a perigee of 288 km. Data were taken with a plastic scintillation spectrometer equipped with a 16-channel pulse height analyzer operating in two energy ranges, 0.3 to 2.6 Mev and 0.3 to 10.0 Mev. The data presented were all taken at B, L points whose traces have minimum altitudes of 200 to 355 km. In the Starfish region (L approx.- 1.3) the spectrum was fission-like at energies above approx.-2 Mev and rather flat below this energy, whereas on higher L shells the spectrum was considerably softer. The energy spectrum, during the period after the sudden commencement of October 29, 1963, underwent significant temporal changes for L approx.> 3, but always displayed a general softening with increasing L value, except for hardening at L approx.= 3-5 corresponding to the outer belt. (Author)

AD-618 492 Div. 2/7, 15/2
CFSTI Prices: HC$2.00 MF$0.50

United Aircraft Corp., East Hartford, Conn.
PREDICTION IN THE STRATOSPHERE.
Final rept. for Oct 64-Apr 65,
by Frederick P. Ostby, Jr., Keith W. Veigas, and Bernard J. Erickson. Jun 65, 50p
Contract AF19 628 3437, Proj. 2.0, Task 2.2
ESD TR-65-10
Unclassified report

Prepared in cooperation with Travelers Research Center, Inc., Hartford, Conn., Rept. no. 7463-170.

Descriptors: (*Weather forecasting, Stratosphere), (*Stratosphere, Weather forecasting), Statistical analysis, Atmospheric motion, Feasibility studies, Wind, Pressure.

The report describes a base technique for the 24- and 48-hr prediction of stratospheric contour height changes in winter at 100, 50, and 30 mb. On independent data, this technique yields superior results to persistence at all three levels and for both forecast intervals. Prediction equations are derived by applying the screening regression technique to atmospheric variables at a network of grid points surrounding a predicand point. Incorporation of predictors, based on perfect prognoses at lower levels, brings about a significant improvement in the results. Some improvement is also noted when a geographical stratification is employed. However, orientation of the grid network with the flow pattern did not result in any substantial improvement. (Author)

AD-618 549 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

Saint Louis Univ., Mo.
THE SHELL STRUCTURE OF THE VISIBLE TORNADO VORTEX.
Master's thesis,
by James C. Devine. 1965, 94p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Tornadoes, Vortices), (*Meteorological parameters, Tornadoes), Model theory, Photographic analysis, Pressure, Fluid mechanics.

The tornado is the smallest yet most destructive of all storms. Its small size, intensity, and infrequency reduce considerably the opportunity to obtain useful data on the region inside of the visible funnel. The closest approach to a recording instrument in reports studied by the writer was three hundred meters. The lack of information regarding the funnel region has seriously handicapped the understanding of the tornado structure. In this study, a first approximate model was developed, principally geometrically and kinematically, to demonstrate the reasonable existence of the 'shell structure' observed in the initial developing stages of tornadoes and waterspouts. This feature was shown to result from a narrow radial zone of subcondensation pressure bounded at the inner radius by contact with dry air in the core of the funnel. Relating the parameters to observations from nature, it was developed that only low level flow of an initial depth of about sixty meters or less should be considered as contributing to the total inflow from the outer region. It was further shown that the radial distance from which a tornado draws its external support is small, about one-half mile or less.

AD-618 584 Div. 2/7

Defence Research Telecommunications Establishment, Ottawa (Ontario).
THE ASSOCIATION BETWEEN RADIO AND VISUAL AURORA,
by P. E. Kelly. 12 Jan 65, 6p
Unclassified report

Pub. in Canadian Journal of Physics v43 p1167-71 Jun 1965 (Copies available only to DDC users).

Descriptors: (*Aurorae, Scanning), (*Radio signals, Aurorae), (*Visual signals, Aurorae), Photometers, Radar equipment, Light pulses, Atmosphere, Canada.

Sections of the northern sky were scanned by radar and photometer at the Prince Albert Radar Lab. in central Saskatchewan, Canada, with its radar of 448-Mc/s frequency. Results demonstrated that there is often good spatial and temporal correlation between radio and visual aurora when (1) the visual aurora form is high enough in elevation angle so that the atmospheric extinction does not preclude its detection, (2) the lower atmosphere is clear of clouds and haze, and the background light from the moon and other sources is low for permitting observation of visual aurora, and (3) the aspect angle is close in orthogonality (low elevation angles in the direction of the magnetic north from Prince Albert) for permitting detection of radio auroral returns.

AD-618 585 Div. 2/7, 8/6, 30/5

Defence Research Telecommunications Establishment, Ottawa (Ontario).
A SURVEY OF TOPSIDE SOUNDING OF THE IONOSPHERE,
by J. H. Chapman. 1964, 21p
Unclassified report

Pub. in Progress in Radio Science 1960-1963. The Ionosphere v3 p46-64 1965 (Copies available only to DDC users).

Descriptors: (*Atmospheric sounding, Ionosphere), (*Ionosphere, Atmospheric sounding), (*Scientific satellites, Atmospheric sounding), (*Sounding rockets, Ionosphere), Radio waves, Electron density, Electromagnetic wave reflections.

Topside sounding experiments have been conducted using rocket-borne fixed-frequency sounders in June and October 1961, and a sweep-frequency topside sounder in the satellite 1962 Beta Alpha One (Alouette) launched 29 September 1962. This paper reviews the techniques of topside sounding, and some of the more significant results obtained from these experiments. (Author)

AD-618 587 Div. 2/7

Air Force Cambridge Research Labs., Bedford, Mass.
AURORAL ZONE EMISSIONS CENTERED AT 700 CYCLES PER SECOND.
Environmental research papers (Revised ed.),
by Jules Aarons, William Barron, Alv Egeland, Georg Gustaffson, and Sven Olsen. 1 Dec 64, 13p
Rept. nos. AFCRL-65-352; ERP-105
Proj. 5629 Unclassified report
Pub. in Journal of Geophysical Research v70 n5 p1079-82 Mar 1 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 17 Apr 64.

Descriptors: (*Aurorae, Electromagnetic waves), (*Electromagnetic waves, Aurorae), (*Ionospheric propagation, Aurorae), Bandwidth, Diurnal variations, Very low frequency, Protons, Environmental tests.

An emission band between 500 and 1000 cps has frequently been recorded at the Kiruna Geophysical Observatory (geomagnetic latitude 65.3 degrees N) by a swept frequency battery-operated analyzer. The most important characteristics of this enhanced electromagnetic radiation are the following: (1) The maximum signal strength is observed at a fixed frequency (700 ± 100 cps). (2) The bandwidth of the emission is normally less than 500 cps. (3) The shape of the emission band is asymmetrical. The hypothesis advanced is that this emission band may be due to radiation at the gyrofrequency of protons. Propagation conditions determine the latitude where this band emission can be detected on the ground. (Author)

AD-618 625 Div. 2/7, 8/6, 12/1

University of Western Ontario, London. Dept. of Physics.
SATELLITE TRANSMISSION MEASUREMENTS OF IONOSPHERIC ELECTRON CONTENT AT A TIME OF LOW SOLAR ACTIVITY,
by G. F. Lyon. 18 Dec 64, 10p
Grant DRB9511 58
Unclassified report

Pub. in Canadian Journal of Physics v43 p1059-67 1965 (Copies available only to DDC users).

Descriptors: (*Electron density, Measurement), (*Ionospheric propagation, Very high frequency), (*Communication satellites(Active), Ionospheric propagation), Radio transmission, Terrestrial magnetism, Meteorological satellites, Solar disturbances, Magneto-optic effect, Canada.

The results of observations of the 54-Mc/s signal from Transit IVA (1961 Omicron 1) during a 12-month period are presented. Total columnar electron content measurements are made by the differential Faraday rotation method. It is shown that the electron content is inversely dependent upon the magnetic-activity index during the summer months but not during the winter. The presence of horizontal gradients in content is sometimes indicated. It is also found that the variation of electron content with solar zenith angle indicates an ionosphere approximating an ideal Chapman layer. (Author)

05. Behavioral and Social Sciences

AD-617 914 Div. 28/2
CFSTI Prices: HC$1.00 MF$0.50

Autonetics, Downey, Calif.
A COMPARISON OF OPERABILITY AND READABILITY OF FOUR TYPES OF ROTARY SELECTOR SWITCHES,
by Peter E. Kolesnik. Jun 65, 24p
Rept. no. T5-1187/3111
Unclassified report

Descriptors: (*Rotary switches, Human engineering), (*Display systems, Rotary switches), Operation, Scale, Errors, Design, Performance(Human).

A fixed-scale rotary switch can be set faster than three types of moving-scale rotary switches. The more digits exposed, the faster a rotary switch can be positioned. A fixed-scale and three types of moving-scale rotary switches can be set with equally high accuracy. The settings of moving-scale switches can be read more accurately than settings of the fixed-scale switch. The fewer digits exposed, the faster and more accurately a rotary switch can be read. It is recommended that moving-scale switches, rather than fixed-scale switches, be used where accuracy of switch position reading is more important than speed of setting. A moving-scale with 3 digits exposed is preferable to moving-scales with 1 or 10 digits exposed, because of advantages in speed of setting, accuracy of position reading, and subjective positioning preference. A hybrid switch should be developed to incorporate the outstanding features of both the fixed-scale and the moving-scale (3 digits) switches. The hybrid switch should result in positioning speeds comparable to the present fixed scale type with a low reading error rate as is found in the moving-scale (3 digits) type. (Author)

AD-617 919 Div. 28/4
CFSTI Prices: HC$2.00 MF$0.50

Psychometric Lab., Univ. of Chicago, Ill.
METHODOLOGY OF PREFERENCE MEASUREMENT. PREDICTION OF CONSUMER CHOICE.
Phase rept. for 1 Jun-31 Dec 55,
by Lyle V. Jones. 31 Dec 55, 50p Rept. no. 2
Contract DA19 129QM272, Proj. 7 84 15 007
DSSC P-1101-2
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Decision making, Psychometrics), Taste, Food, Costs, Public opinion, Least squares method, Differential equations, Correlation techniques.

The paper serves as a report of preliminary attempts to study empirically the prediction of choice methodology proposed, in 1945, by Thurstone. Competing entrees on a luncheon menu serve as stimuli. Two variables, preference and price, are considered in the prediction of relative selection for each competing item.

AD-617 920 Div. 28/4
CFSTI Prices: HC$1.00 MF$0.50

Psychometric Lab., Univ. of Chicago, Ill.
METHODOLOGY OF PREFERENCE MEASUREMENT. PREDICTION OF CONSUMER CHOICE.
Progress rept. for 1 Jan-31 Mar 56,
by Lyle V. Jones. 31 Mar 56, 19p
Rept. no. 3
Contract DA19 129qm272, Proj. 7 84 15 007
DSSC P-1101-3
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale. See also AD-617 919.

Descriptors: (*Decision making, Psychometrics), Taste, Food, Statistical tests, Public opinion, Mathematical models.

The paper reports an application of a statistical test and multivariate model to the preferences of certain groups of respondents to the Quartermaster Food Preference Survey 006. Perferences for fourteen selected menu items were studied.

AD-617 921 Div. 28/4
CFSTI Prices: HC$1.00 MF$0.50

Psychometric Lab., Univ. of Chicago, Ill.
METHODOLOGY OF PREFERENCE MEASUREMENT. PREDICTION OF CONSUMER CHOICE.
Progress rept. for 1 Jun-31 Jul 56,
by Lyle V. Jones. 31 Jul 56, 9p
Rept. no. 5
Contract DA19 129QM272, Proj. 7-84-15-007
DSSC P-1101-5
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale. See also AD-617 920.

Descriptors: (*Decision making, Psychometrics), Mathematical prediction, Mathematical models, Food, Least squares method, Iterative methods, Costs, Public opinion.

A model is presented for predicting the proportion of consumers who purchase each of three competing objects differing in price. The model is applied to predict proportions of consumers purchasing each of three luncheon entrees on several criterion days. Preference parameters are estimated from responses to a food preference schedule by a least squares method of successive intervals; an iterative solution is utilized for estimating the utility of each price level. Results indicate that the model is tenable, and suggest a non-monotonic relationship between utility of price and monetary price level within the range of prices investigated. (Author)

AD-617 924 Div. 28/5
CFSTI Prices: HC$1.00 MF$0.50

Colorado Univ., Boulder.
EFFECTS OF PERSONALITY AND OWN STAND ON JUDGMENT AND PRODUCTION OF STATEMENTS ABOUT A CENTRAL ISSUE.
Technical rept.,
by B. Jack White and O. J. Harvey. '964, 24p
Rept. no. TR-11
Contract Nonr114707
Unclassified report

Research done in cooperation with Utah Univ., Salt Lake City.

Descriptors: (*Personality, Attitudes), (*Attitudes, Personality), Social psychology, Behavior, Group dynamics, Religion, Psychometrics, Correlation techniques.

Pro-Mormon Ss who varied in authoritarianism, dogmatism and concreteness-abstractness as well as position of own stand judged a series of statements according to their favorablesness-unfavorableness toward the Mormon religion and produced items of their own about the church. With effects of own stand controlled through matching of Ss within personality groupings, differences in concreteness-abstractness, but not in authoritarianism or dogmatism, significantly affected the usage of extreme categories, number of categories used, width of gap in judgmental scale and the 'pro-ness' of the items produced. Own stand correlated -.17 with the tendency to use extreme categories, suggesting that this factor significantly influences judgmental activity only when it is highly extreme and intense and that some of the effects attributed to this variable in earlier studies could more appropriately be ascribed to variations in personality. (Author)

AD-617 926 Div. 32/9, 28/5
CFSTI Prices: HC$1.00 MF$0.50

Wisconsin Univ., Madison.
STUDY OF THE INFLUENCE OF CERTAIN CULTURAL AND CONTENT VARIABLES ON THE EFFECTIVENESS OF PERSUASIVE COMMUNICATIONS IN THE INTERNATIONAL FIELD.
Quarterly status rept.,
by S. Watson Dunn. 1 Jul 65, 7p
Contract Nonr120224, Proj. NR177 287
Unclassified report

Descriptors: (*Culture, Social communication), (*Social communication, Culture), (*Social psychology, Social communication), Effectiveness, Sociology, Public opinion, Attitudes, Sociometrics, Statistical data, Egypt, France.

AD-617 956 Div. 28/5
CFSTI Prices: HC$3.00 MF$0.75

Ohio State Univ. Research Foundation, Columbus.
PRIMER FOR PRODUCTIVITY.
Final technical rept. for 1 Oct 62-30 Sep 64,
by Harold B. Pepinsky, Karl E. Weick, and John W. Riner. Mar 65, 69p Rept. no. TR-1
Grant AF AFOSR62 339, Proj. 9778, Task 9778 2
AFOSR 65-0491
Unclassified report

Prepared in cooperation with Purdue Univ., Lafayette, Ind.

Descriptors: (*Group dynamics, Performance(Human)), (*Performance(Human), Production), Social psychology, Attitudes, Social communication, Culture, United States, Social sciences, Performance(Human), Motivation, Leadership, Behavior.

A systematic and empirical case is made for the observing and interpreting, by a spectator, of the productivity of persons who hold membership in utilitarian organizations within American society. First, a metatheory of work in organizational environments, introducing key concepts for the spectator and diferentiating between spectator and participant definitions of the work situation, is offered. This is followed by a definition of productivity, which again meaningfully differentiates between the causally textured definitions of spectators and participants and between such participant definitions as those of superordinate and subordinate persons. Testable propositions concerning work and its accomplishment are advanced. Second, a formal spectator's definition of organization, utilizing key concepts and definitions from the foregoing discussion, is presented. Third, an empirical case, which illustrates how key ideas can be applied to the study of organizations, is given. And finally, the authors pose a number of issues about organizational behavior, suggested by a comparison of their ideas with those of other investigators. (Author)

AD-617 968 Div. 32/8
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE 'EUROPE' OF THE FRENCH,
by Nathan Leites. Jun 65, 47p Memo. no. RM-4584-ISA
Contract SD300
Unclassified report

Descriptors: (*Foreign policy, France), (*France, Foreign policy), Political science, Europe, Government(Foreign), Attitudes, Public opinion, Leadership.

A presentation of French reactions to the prospects of European unity is given. Considering the views of Gaullists, opposition leaders, and the general public, the author finds that, while the Europe of shared facilities is accepted almost unanimously, rapid or systematic progress toward a unified Europe seems neither urgent nor even acceptable. (Author)

AD-618 003 Div. 23/4

System Research Ltd., Richmond (England).
TEACHING AS A CONTROL-ENGINEERING PROCESS,
by Gordon Pask. 1964, 6p
Contracts AF61 052 640, AF61 052 402
AFOSR 65-0583
Unclassified report

Pub. in Control and Automation Progress v9 n79 p6-11 Jan 1965 (Copies available only to DDC users).

Descriptors: (*Teaching machines, Control systems), (*Education, Teaching machines), Cybernetics, Learning, Training devices, Special purpose computers, Display systems, Design, Students, Great Britain.

The field of teaching machines is reviewed with particular emphasis on adaptive teaching systems, or systems in which the teaching machine is an adaptive control mechanism. The aim of the review is to indicate the kind of machinery that exists, the kind of work that is being done, and the results that are achieved. The problem of designing an adaptive control mechanism for an adaptive teaching system is discussed. The argument is concentrated on a single case for which a certain design (or teaching strategy embodied in a design) can be justified. The discussion may be of interest to the control engineer because: (1) the process to be controlled, a learning process in man, has an unfamiliar logical calibre (to illustrate this I shall exhibit the minimal model for man that is needed to design such a control mechanism); (2) the system is relatively intractable and the design procedure is genuinely cybernetic; (3) it is shown that the man is dynamically stable only if his environment is so adjusted, by the adaptive machine, that his rate of learning can be always positive; (4) the teaching system is designed by specifying a stabilizing system and later arguing that, because dynamic stability implies the existence of a positive learning rate, any stabilizing system is also a teaching system; and (5) there are many other intractable systems, notably in the social sciences and in connection with industrial organizations, which might be controlled in a very similar fashion.

AD-618 076 Div. 28/5
CFSTI Prices: HC$2.00 MF$0.50

Beaver Coll., Glenside, Pa.
A STUDY OF THE INTERRELATIONSHIP OF PRIOR

REINFORCEMENT AND VARIABLES IN THE INDIVIDUAL AS PREDICTORS OF SOCIAL INTERACTION.
Technical rept.,
by Ronald H. Bohr and Bernard Mausner. 1965, 31p
Rept. no. TR-1
Contract Nonr G0000665, Proj. NR171 456
Unclassified report

Available copy wll not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Behavior, Social psychology), (*Personality, Social psychology), Group dynamics, Attitudes, Anxiety, Perception(Psychology), Tables, Analysis of variance.

In a laboratory investigation of the effect of prior reinforcement and personality upon social interaction, 85 adult non-college Ss run in pairs made simple perceptual judgments alone and were then subjected to contradictory judgments purportedly made by a fellow observer. Subjects were run in five expermental conditions differing in the frequency with which responses in the first along judgments were positively reinforced. Differences in Ss acceptance of the fellow observer's judgmental range were seen as a function of the interaction of situational and intra-individual determinants. Ss low in dogmatism maintained ther judgments if reinforced, shifted when non-reinforced; Ss high in dogmatism showed no significant difference in shift as a function of level of reinforcement. Dogmatism is posited to be a modulator variable which differentially influences the potency of a given situational determinant of shift. (Author)

AD-618 081 Div. 28/3
CFSTI Prices: HC$1.00 MF$0.50

Stockholm Univ. (Sweden). Psychological Labs.
THE INFLUENCE OF INTENSITY AND DURATION OF ELECTRICAL STIMULATION ON SUBJECTIVE VARIABLES.
Scientific rept.,
by Gosta Ekman, Marianne Frankenhaeuser, Sonja Levander, and Inga Mellis. Jan 65, 10p Rept. no. 179
Grant AF EOAR29 64, Proj. 9778, Task 977801
AFOSR 65-1304
Unclassified report

Descriptors: (*Pain, Psychophysiology), (*Alternating current, Psychophysiology), (*Perception(Psychology), Alternating current), Reaction(Psychology), Thresholds(Physiology), Stress(Psychology), Intensity, Stimulation, Functions, Sweden.

The unpleasantness and subjective duration of an A.C. current of 50 c/sec applied to two fingers was scaled by subjects using the method of magnitude estimation. Stimulation was varied with regard to both intensity, ranging between 1.5 and 3.5 times the individual sensation threshold, and duration, ranging from 0.18 to 1.72 sec. It was found (1) that unpleasantness increased approximately logarithmically with stimulus duration, (2) that unpleasantness was a power function, with the exponent 1.5, of stimulus intensity measured with the sensation threshold as zero point, (3) that subjective duration was essentially linearly related to stimulus duration, and (4) that subjective duration increased approximately logarithmically with intensity of stimulation. (Author)

AD-618 115 Div. 28/5
CFSTI Prices: HC$1.00 MF$0.50

Arizona State Univ., Tempe.
THE EFFECTS OF VARYING PAY-OFF VALUES UPON SHARING BEHAVIOR IN A TWO-PERSON INTERACTION.
Technical rept.,
by Arthur J. Bachrach, Donald R. Witters, and Andree Fleming-Holland. Jun 65, 20p
Contract Nonr279403
Unclassfied report

Descriptors: (*Behavior, Social psychology), Verbal behavior, Performance(Human), Motivation, Reaction-(Psychology).

In a two-person situation in which the reinforcement (money) of vocalization by one individual has a detrimental reinforcement effect upon the other individual, this study demonstrates that the first individual may sacrifice his own reinforcement by sharing it with the other. The degree of such 'self sacrifice via sharing' in the laboratory was shown to be a function of the cost involved. (Author)

AD-618 116 Div. 28/5, 15/1
CFSTI Prices: HC$1.00 MF$0.50

Arizona State Univ., Tempe.
THE EFFECTS OF VARYING PAY-OFF MATRICES UPON COALITION FORMATION IN A THREE-PERSON NEGOTIABLE GAME.
Technical rept.,
by Kathryn Louise Morris and Donald R. Witters.
Jun 65, 18p
Contract Nonr279403
Unclassified report

Descriptors: (*Group dynamics, Game theory), (*Game theory, Group dynamics), Social psychology, Females, Performance(Human), Matrix algebra.

Three female university students were placed in a group situation in which the subjects (Ss) earned points by responding on a switch in alliance with another member of the group. The procedure for delivering a reinforcer was changed from a payoff matrix of equality (A=B=C) to several payoff matrices of inequality (A<(B+C), A>B>C, and A>(B+C)). It was found that the Ss pursued a strategy of sharing; i.e., keeping the money equal, and that at the beginning of each session the Ss decided how they would respond during the session. The data show that the Ss' actual performances closely conformed to their expected performances in all but seven sessions. In those sessions where their performance deviated from the expected performance their total earning was increased by this deviation. (Author)

AD-618 117 Div. 28/1, 15/1
CFSTI Prices: HC$1.00 MF$0.50

Arizona State Univ., Tempe.
A COMPARISON OF THEORETICAL BEHAVIOR WITH OBSERVED BEHAVIOR IN A TWO-PERSON ZERO-SUM GAME INTERACTION.
Technical rept.,
by Barbara J. Kulik. Jun 65, 22p
Contract Nonr279403
Unclassified report

Descriptors: (*Game theory, Behavior), (*Behavior, Game theory), Optimization, Decision making.

Two male subjects played five two-person zero-sum games involving two or three strategy choices per person. It was observed that games with pure strategy solutions could have these solutions approximated within 30 trials or less but that solutions to the mixed strategy games could not be approached in 50 trials. The subjects, though instructed, did not always behave in the 'rational' way of following the minimax principle. (Author)

AD-618 126 Div. 32/9

American Univ., Washington, D. C. Foreign Areas Studies Div.
U. S. ARMY AREA HANDBOOK FOR THE UNITED ARAB REPUBLIC (EGYPT).
Dec 64, 441p
DA PAM-550-43
Unclassified report

Available from Superintendent of Documents, GPO, Washington, D. C. 20402, HC $1.25, as D101.22:550-43. Available from CFSTI MF$2.25.

Descriptors: (*Egypt, Handbooks), Sociology, History, Culture, Language, Education, Religion, Public health, Political science, Government(Foreign), Economics, Agriculture, Labor, Industries, Banking, Foreign policy, Armed forces(Foreign).

AD-618 133 Div. 28/3
CFSTI Prices: HC$2.00 MF$0.50

Stockholm Univ. (Sweden). Psychological Labs.
AN EXPERIMENTAL STUDY ON RELATIVITY, ERROR AND SEX DIFFERENCES IN THE PERCEPTION OF VELOCITY, TIME AND DISTANCE.
Scientific rept.,
by Madjid Mashhour. Sep 63, 27p Rept. no. 159
Grant AF EOAR29 64, Proj. 9778, Task 977801
AFOSR 65-1305
Unclassified report

Descriptors: (*Space perception, Psychophysiology), (*Perception(Psychology), Time), (*Visual perception, Velocity), Errors, Motion, Males, Females, Sweden.

Proceeding from the principle of relativity in perception, it was found empirically that subjective velocity of and subjective distance (space) covered by a moving object are also relative, in the sense that (a) subjective velocity is a negatively decelerating power function of the motion-track length (or observation time); (b) subjective motion-track length varies directly with speed (actually it varies inversely with time); (c) the relation between subjective velocity and time (or space) as well as that between subjective space and time are independent of any definition of physical velocity. The absolute error of the subjective velocity (time, space) estimates was found to be a parabolic function of the subjective estimates of velocity (time, space) lying between 0-1, while a linear function was found for the values beyond 1. The relative error follows a hyperbolic curve for the subjective estimates of velocity (time, pace) within the former range but a parabolic curve within the latter one. Sex differences were not found in the estimation of subjective time and space. Women, however, have higher estimates of the same subjective speeds than men have. (Author)

AD-618 148 Div. 32/3

National Research Council of Canada, Ottawa (Ontario).
THE NATIONAL SCIENCE LIBRARY: INFORMATION CENTRE FOR INDUSTRY,
by Jack E. Brown. 1965, 7p Rept. no. NRC-8439
Unclassified report

Pub. in Industrial Canada v65 n1 p2-7 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Libraries, Scientific research), (*Information retrieval, Scientific research), Industries, Data, Data storage systems, Data processing systems, Reports, Documentation, Distribution, Canada.

An account is given of the scope of information avalable at the National Science Library and various services provided by the library for the scientific and industrial communities of Canada.

AD-618 173 Div. 28/3, 16/15

Walter Reed Army Inst. of Research, Washington, D. C.
ELECTRORETINOGRAM IN NEWBORN HUMAN INFANTS,
by Ann B. Barnet, Ann Lodge, and John C. Armington.
1965, 4p
Unclassified report

Pub. in Science v148 n3670 p651-4 Apr 30 1965 (Copies not available to DDC or Clearinghouse customers).
Prepared in cooperation with Washington School of Psychiatry, D. C.

Descriptors: (*Infants, Visual acuity), (*Visual acuity, Infants), (*Color vision, Infants), Vision, Visual perception, Psychophysiology, Behavior, Light, Stimulation, Retina, Electronic recording systems.

The electroretinogram of the newborn human shows the x-wave component which was demonstrated by Adrian and others to be a concomitant of photopic visual function in the adult. This finding may provide electrophysiological support for behavioral observations indicating that infants have some color vision and ability to resolve visual stimuli. (Author)

AD-618 181 Div. 32/4

RAND Corp., Santa Monica, Calif.
RISK, THE DISCOUNT RATE, AND INVESTMENT DECISIONS,
by Jack Hirshleifer. 1961, 10p Rept. no. P-2143
Unclassified report

Pub. in American Economic Review v51 n2 p112-20 May 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Banking, Economics), (*Economics, Banking), Probability, Decision making, Money, Theory.

AD-618 230 Div. 28/5

Vanderbilt Univ., Nashville, Tenn.
ATTITUDE CHANGE AS A FUNCTION OF AUTHORITARIANISM AND PUNITIVENESS,
by Jack M. Wright and O. J. Harvey. 10 Jun 63, 5p
Contract Nonr214902
Unclassified report

Pub. in Journal of Personality and Social Psychology v1 n2 p177-81 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Attitudes, Personality), (*Personality, Attitudes), (*Social psychology, Personality), Reaction-(Psychology), Behavior, Psychometrics.

To study reactions to abuse in the form of a non-directional order from an authority figure to change previously stated attitudes, 55 undergraduate psychology students were administered the California F Scale, the Rosenzweig P-F Study, and 5 opinion scales regarding self, peers, instructors, people in general, and certain professions. Authoritarianism related significantly to changes in opinion as a result of treatment while

punitiveness scores did not. No evidence of displacement among more authoritarian Ss was found. On the contrary, the results suggest that because of previous histories more authoritarian Ss may expect (and accept as proper) abuse from authority figures; consequently they did not feel frustrated but confirmed by derogation from the instructor. (Author)

AD-618 235 Div. 28/5

North Carolina Univ., Chapel Hill.
THE DEVELOPMENT OF CONTRACTUAL NORMS IN A BARGAINING SITUATION UNDER TWO TYPES OF STRESS,
by John Thibaut and Claude Faucheux. 1965, 15p
Contract Nonr85504

Unclassified report

Pub. in Journal of Experimental Social Psychology v1 n1 p89-102 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Bargaining, Stress(Psychology)), (*Group dynamics, Bargaining), Social psychology, Behavior, Attitudes, Game theory.

It is suggested that when power differentiation exists in a group whose members have a background of high interdependence and highly convergent interests, the introduction of both external and internal threats to the continued viability of the group creates the conditions for the emergence of norms which to a significant degree reduce the disruptive consequences of the threats.

AD-618 238 Div. 28/1

Oxford Univ. (England).
EXTINCTION AS A FUNCTION OF THE ORDER OF PARTIAL AND CONSISTENT REINFORCEMENT,
by N. S. Sutherland, N. J. Mackintosh, and J. B. Wolfe. 2 Dec 63, 5p
Contract N62558 2453

Unclassified report

Pub. in Journal of Experimental Psychology v69 n1 p56-9 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Learning, Conditioned reflex), (*Conditioned reflex, Learning), Training, Reaction-(Psychology), Rats, Great Britain.

Forty rats were trained in a straightway under partial or consistent reinforcement (PR or CR) or with one type of reinforcement schedule followed by the other, and were then extinguished. There was no significant difference in resistance to extinction between Ss given PR training alone, and Ss given CR after PR; but giving CR before PR significantly reduced resistance to extinction. These results are in disagreement with both the discrimination hypothesis and a cognitive dissonance account of PR, but confirm a prediction made by a new explanation of the PR effect. (Author)

AD-618 266 Div. 28/1

Oxford Univ. (England). Inst. of Experimental Psychology.
TRANSPOSITION AFTER SINGLE STIMULUS TRAINING,
by N. J. Mackintosh. 1965, 4p
Contract N62558 3927

Unclassified report

Pub. in American Journal of Psychology v78 n1 p116-9 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Learning, Theory), Training, Performance tests, Rats, Great Britain.

Lashley-Wade's and Grice's experiments, in which rats were pretrained to jump to or away from a single circle and then tested on a size-discrimination, were repeated. It was shown that such pretraining involves the learning of a brightness-discrimination between two stimuli--the dark, blank door, and the brighter circle--and that Grice's results therefore are not critical for Lashley and Wade's theoretical position. (Author)

AD-618 267 Div. 28/1

Oxford Univ. (England). Inst. of Experimental Psychology.
THE EFFECT OF ATTENTION ON THE SLOPE OF GENERALIZATION GRADIENTS,
by N. J. Mackintosh. 7 Apr 64, 7p
Contract N62558 3927

Unclassified report

Pub. in British Journal of Psychology v56 n1 p87-93 1965 (Copies available only to DDC users).

Descriptors: (*Learning, Rats), Attention, Brightness, Performance tests, Analysis of variance, Great Britain.

Forty-eight rats were given 100 rewarded trials with a single rectangle, and were then tested for generalization between this first rectangle and another differing from it either in brightness or in orientation. Thirty-two of the rats had received prior training either on a successive brightness or an orientation discrimination. The sixteen subjects who had received no prior training showed intermediate gradients of generalization. Of the pretrained subjects, those who were tested for generalization along the same dimension as their pretraining discrimination showed significantly steeper gradients, while those who were tested for generalization along the opposite dimension showed significantly less steep gradients. (Author)

AD-618 274 Div. 28/3, 28/1

Walter Reed Army Inst. of Research, Washington, D. C.
SIGNAL UNCERTAINTY AND SLEEP LOSS,
by Harold L. Williams, Ometta F. Kearney, and Ardie Lubin. 1965, 7p

Unclassified report

Pub. in Journal of Experimental Psychology v69 n4 p401-7 Apr 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sleep, Performance(Human)), (*Performance(Human), Sleep), (*Attention, Performance-(Human)), Visual acuity, Signals, Detection, Performance tests, Body temperature, Psychophysiology.

During a 3-5 day base-line period, 2 days of sleep loss, and 3 days of recovery, 52 Ss performed 3 visual vigilance tasks, of 10 min. each ranging in signal uncertainty from complete redundancy to .84 bit per second. The major effect of uncertainty was to cause errors of omission which increased with sleep loss. The interaction between signal uncertainty and sleep loss was significant. Task duration (of 10 min.) caused no impairment during the base-line and recovery phases, but during sleep loss, errors of omis-

sion rose sharply on the last 3 min. of each task. There was no significant interaction between signal uncertainty and task duration. Decrement was considerably greater for Ss working alone than for Ss working in a group. Oral temperature had no consistent relation to errors of omission or to sleep loss. (Author)

AD-618 278 Div. 32/11, 32/2

California Univ., Los Angeles. Graduate School of Business Administration.
ECONOMICS OF LANGUAGE,
by Jacob Marschak. 1964, 8p
Reprint no. WMSI-18
Contract Nonr23375

Unclassified report

Pub. in Behavioral Science v10 n2 p135-40 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Social communication, Language), (*Language, Social communication), Communication systems, Optimization, Culture, Decision making, Dictionaries, Social sciences, Mathematical analysis, Probability, Statistical analysis.

An 'evolutionary' approach to the study of language and effective social communication is contrasted with the 'normative' approach, which is exemplified in debates about dictionaries.

AD-618 289 Div. 28/3
CFSTI Prices: HC$5.00 MF$1.00

Stockholm Univ. (Sweden). Psychological Labs.
PSYCHOPHYSICAL RELATIONS IN THE PERCEPTION OF VELOCITY,
by Madjid Mashhour. 1964, 178p
Grant AF EOAR29 64
AFOSR 65-1303

Unclassified report

Rept. on Stockholm Studies in Psychology no. 3.

Descriptors: (*Psychophysiology, Perception(Psychology)), (*Velocity, Perception(Psychology)), (*Perception(Psychology)), Velocity), Measurement, Stimulation, Test methods, Space perception, Reaction-(Psychology), Time, Eye, Motion, Visual perception, Retina, Mathematical analysis, Tables, Sweden.

The volume concerns investigations on some observable aspects of man's reaction to stimulation by motion at various rates in an experimental situation that allows the presentation of motion-stimulus in its almost irreducible simplicity. Since the fundamental physical variable is velocity and the reaction is closely related to perceptual processes, the investitation is termed 'psychophysical relations in the perception of velocity'. The aspects of reaction constitute a group of problems each of which is studied independently.

AD-618 302 Div. 28/5
CFSTI Prices: HC$3.00 MF$0.75

Western Behavorial Sciences Inst., La Jolla, Calif.
ANALYSIS OF SOCIAL POWER.
Final rept.,
by Richard E. Farson, James R. Johannsen, and Lawrence N. Solomon. May 65, 86p
Contract Nonr359000, Proj. NR171 802

Unclassified report

Descriptors: (*Leadership, Social psychology), (*Personality, Perception(Psychology)), (*Social psychology, Power), Behavior, Group dynamics, Males, Females, Tables.

Two studies were undertaken to explore certain aspects of the power-role. Study I, 'Perceived Correlates of Predictability in Behavior,' investigated the relationship between an individual's perceived-interpersonal-power and the degree to which others accurately perceive him (his 'predictability'), and assessed the perceived personality traits and types of power associated with predictable and unpredictable persons. Study II, 'Power Role Assignments,' investigated the question of whether or not randomly selected persons can convincingly assume a maximum or minimum power-role if so instructed. In addition, the personality traits, behavior patterns, and types of power associated with both power roles were investigated.

AD-618 311 Div. 32/3
CFSTI Prices: HC$3.00 MF$0.75

Dunlap and Associates, Inc., Darien, Conn.
DATA FILE SIZE AND ITS RELATION TO THE BAYESIAN EFFECTIVENESS OF AN INFORMATION RETRIEVAL SYSTEM.
Interim rept. for 16 Feb-15 Apr 65,
by Ugo O. Gagliardi. Apr 65, 86p
Contract AF19 628 5057, Proj. 2806, Task 280609
ESD TR-65-275

Unclassified report

Descriptors: (*Information retrieval, Effectiveness), (*Data storage systems, Effectiveness), Statistical analysis, Data processing systems, Mathematical models, Subject indexing, Decision theory, Probability, Errors.

A simple Bayesian measure of system effectiveness for information retrieval systems is proposed. The measure combines the recall and precision ratios of an information system with the utility structure of the system user. Using the measure, it is possible to show that effective systems are possible only under a very narrow set of conditions. In particular, it is shown that using present state-of-the-art indexing, it is not possible to have effective systems with file sizes much in excess of 100,000 documents. (Author)

AD-618 312 Div. 32/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
WHAT DO SEMIOTICS SPEAK ABOUT.
by A. Kondratov. 15 Jul 65, 18p
Rept. no. FTD-TT-65-326
TT 65-62655

Unclassified report

Unedited rough draft trans. of Znanie-Sila (USSR) v38 n3 p10-3 1963.

Descriptors: (*Language, Theory), Signals, USSR, Communication theory.

AD-618 324 Div. 28/3, 16/15
CFSTI Prices: HC$2.00 MF$0.50

Human Engineering Labs., Aberdeen Proving Ground, Md.
RELIABILITY OF TEMPORARY THRESHOLD SHIFTS CAUSED BY REPEATED IMPULSE-NOISE EXPOSURES.
Technical memo.,
by David C. Hodge, R. Bruce McCommons, and Raymond F. Blackmer. Feb 65, 34p Rept. no. TM-3-65

Unclassified report

Descriptors: (*Auditory acuity, Noise), (*Noise,

Auditory acuity), Human engineering, Thresholds-(Physiology), Automatic weapons, Small arms, Performance(Human), Hearing, Behavior, Reaction-(Psychology), Audiofrequency, Audiometry, Army personnel, Tables.

Twenty-two subjects were exposed to the same gunfire-noise condition nine times. Their auditory thresholds were measured at six frequencies from 500 to 6000 cycles per second before and after exposure, and all temporary threshold shifts (TTS) were converted to TTS2 for ease of comparison. Fluctuations in mean TTS2 were five dB or less for all frequencies across the nine exposures, but individual differences were large and the reliability coefficients were small. It was concluded that, while repeated-measurement experimental designs appear appropriate for impulse-noise studies, group data are more meaningful than data for individual subjects. Very small samples of subjects should not be used for such studies, because it is important to be able to generalize the results to the Army as a whole. (Author)

AD-618 327 Div. 28/3, 16/15
CFSTI Prices: HC$3.00 MF$0.75

Human Engineering Labs., Aberdeen Proving Ground, Md.
PRELIMINARY STUDIES OF THE IMPULSE-NOISE EFFECTS ON HUMAN HEARING (PROJECT HUMIN). Technical memo.,
by David C. Hodge, Hugh W. Gates, Robert B. Soderholm, Charles P. Helm, Jr., and Raymond F. Blackmer. Dec 64, 71p Rept. no. TM-15-64
Unclassified report

Descriptors: (*Auditory acuity, Noise), (*Noise, Auditory acuity), Human engineering, Hearing, Audiometry, Thresholds(Physiology), Behavior, Performance-(Human), Reaction(Psychology), Automatic weapons, Small arms, Audiofrequency, Army personnel.

The report summarizes the accomplishments of the U. S. Army Human Engineering Laboratories impulse-noise program (Project HUMIN). After reviewing past research and stating the rationale for studying how impulse noise affects human subjects, it gives detailed descriptions of the apparatus and procedures which have been developed for the program. The results of four preliminary impulse-noise experiments with human subjects are presented and discussed, together with certain special problems which have arisen during the conduct of the program. The projected future course of the project is outlined. (Author)

AD-618 358 Div. 23/4
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
FURTHER COMMENTS ON THE MATHEMATICAL CONTENT OF THE BUSINESS SCHOOL CURRICULUM,
by G. H. Fisher. Jul 65, 13p Rept. no. P-3172
Unclassified report

Prepared for publication in the Winter 1965 issue of the California Management Review.

Descriptors: (*Commerce, Education), (*Education, Commerce), (*Mathematics, Commerce), Management planning, Statistical analysis, Decision theory, Data processing systems, Training, Students, Universities.

Summary comment: With the increasing emphasis on new analytical concepts, methods and techniques for assisting in planning and decision-making in both public and private enterprise, it would seem that the modern business school has a responsibility to better prepare its graduates (both specialists and generalists) to cope with these problems. This, however, is in large measure a matter of judgment regarding the objectives of the business school--a question that ultimately must be resolved by the individual schools and colleges themselves. (Author)

AD-618 362 Div. 32/8, 18/7
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
INSURGENCY AND COUNTERINSURGENCY: NEW MYTHS AND OLD REALITIES,
by Charles Wolf, Jr. Jul 65, 26p Rept. no. P-3132-1
Unclassified report

Descriptors: (*Guerrilla warfare, Counterinsurgency), (*Counterinsurgency, Guerrilla warfare), Political science, Attitudes, Public opinion, Social sciences, Economics, Leadership, Government(Foreign), Propaganda, Newspapers, Food, Recruitment, Costs.

Conclusion: The main concern of insurgency efforts should be to influence the behavior and action of the populace rather than their loyalties and attitudes. The leadership of countries in which insurgent movements appear can do much to influence the behavior and actions of the populace in ways that will make the operation of the insurgent system substantially more difficult, and will facilitate successful implementation of counterinsurgency programs. At the operational level of specific programs and measures to prevent or control the growth of insurgency, the main thrust of the approach is to focus attention on the difficulties (or opportunities) that would be created for the insurgent system by implementation of a proposed program or measure. The primary consideration should be whether the proposed measure is likely to increase the cost and difficulties of insurgent operations and help to disrupt the insurgent organization rather than whether it wins popular loyalty and support, or whether it contributes to a more productive, efficient or equitable use of resources. Perhaps one major attitudinal effect of the alternative approach may be to modify the attitudes with which counter-insurgency efforts are approached and viewed in the United States. Insurgency may be recognized not as an inscrutable and unmanageable force grounded in the mystique of a popular mass movement, but as a coherent operating system that needs to be understood structurally and functionally if it is to be effectively countered.

AD-618 363 Div. 32/3, 18/2
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ACQUISITION OF SPECIAL MATERIALS: CONFERENCES AND SYMPOSIA; WITH NOTES ON INTELLIGENCE MATERIALS,
by Helen J. Waldron. Jun 65, 42p Rept. no. P-3175
Unclassified report

Revision of a lecture presented on 14 Apr, 64 as a part of Univ. of California, Berkeley, Univ. Extension Course 'Acquisition of Special Materials' Librarianship X404.

Descriptors: (*Documentation, Sources), (*Symposia, Documentation), (*Military intelligence, Documentation), Reports, Periodicals, Abstracting, Indexes, Reviews, Information retrieval, Libraries.

Two distinct types of special materials are considered, neither of which lends itself to dissemination by easily recognizable suppliers, such as dealers. For proceedings or other publications of conferences and symposia,

efforts must be extended to cover other possible sources, such as published 'lists of meetings,' journals, abstracting and indexing services, professional societies, individual authors, etc. For intelligence materials it must be recognized that fully eighty percent are derived from completely open sources even by the federal intelligence agencies themselves. It is proposed, therefore, that a number of organizations be formed to whom inquiries can be directed for geographic, political, economic, scientific, sociological and other data on foreign nations, all of which can be considered intelligence in its broadest sense.

AD-618 374 Div. 28/3, 16/15
CFSTI Prices: HC$2.00 MF$0.50

Human Engineering Labs., Aberdeen Proving Ground, Md.
AUDITORY LOCALIZATION OF NOISES.
Technical memo.,
by Robert W. Bauer and Raymond F. Blackmer.
Jan 65, 27p Rept. no. TM-4-65
Unclassified report

Descriptors: (*Auditory acuity, Noise), (*Noise, Auditory acuity), Human engineering, Audiometry, Hearing, Auditory signals, Targets, Target angle, Performance tests, Errors, Performance(Human), Audiofrequency, Analysis of variance.

The report summarizes three studies of unaided auditory localization of fixed noise sources. Pointing was as accurate as aiming at auditory targets in darkness. Elevation errors were not significantly larger than azimuth errors. Subjects with hearing deviations (defects) performed as well as non-deviant subjects (normals) in auditory localization. (Author)

AD-618 377 Div. 32/5, 15/1, 28/5
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Los Angeles. Western Management Science Inst.
THE ECONOMICS OF UNCERTAINTY XIII.
Working paper,
by Karl Borch. May 65, 23p Rept. no. WP-77
Contract Nonr23375, Proj. NR047 041
Unclassified report

Descriptors: (*Decision making, Economics), (*Economics, Probability), Mathematical models, Game theory.

An elementary presentation of the Bayesian approach to subjective probabilities is given. This is related to the credibility theory developed by American actuaries. (Author)

AD-618 378 Div. 32/4, 15/1, 28/5
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Los Angeles. Western Management Science Inst.
THE ECONOMICS OF UNCERTAINTY VI.
Working paper,
by Karl Borch. Jun 65, 27p Rept. no. WP-79
Contract Nonr23375, Proj. NR047 041
Unclassified report

Descriptors: (*Decision making, Economics), (*Economics, Probability), (*Game theory, Economics), Optimization, Money, Mathematical models, Behavior.

The empirical evidence--from laboratory experiments and economic observations--which may be relevant to the Bernoulli Principle is reviewed. It is concluded that, apart from obvious mistakes, people seem to make the decisions which will maximize expected utility, with a concave function representing the utility of money. (Author)

AD-618 379 Div. 32/4, 15/1, 28/5
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Los Angeles. Western Management Science Inst.
THE ECONOMICS OF UNCERTAINTY VIII AND IX.
Working paper,
by Karl Borch. Jun 65, 35p Rept. no. WP-82
Contract Nonr23375, Proj. NR047 041
Unclassified report

Descriptors: (*Decision making, Economics), (*Economics, Probability), (*Game theory, Economics), Distribution(Economics), Mathematical models, Behavior.

Decision rules are discussed which are independent of probability beliefs. It is indicated that it is possible to prove that such rules are either inconsistent, or equivalent to the Bernoulli principle. The mini-max solution to the zero-sum two-person game isdiscussed. (Author)

AD-618 391 Div. 30/1
CFSTI Prices: HC$2.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
UNCLASSIFIED PUBLICATIONS OF LINCOLN LABORATORY, SUPPLEMENT 1.
Rept. for 15 Mar 64-15 Jun 65,
15 Jun 65, 43p
Contract AF19 628 500
ESD TDR-64-340
Unclassified report

See also AD-607 539.

Descriptors: (*Bibliographies, Scientific research), (*Scientific research, Bibliographies), (*Physics laboratories, Scientific research), Reports, Indexes, Electronics, Physics, Space communication systems, Solid state physics, Lasers, Radio astronomy, Magnetic materials, Atmosphere entry, Materials, Semiconductors, Radar, Engineering.

This list of Unclassified Publications of Lincoln Laboratory is the first Supplement to the 15 March 1964 edition, which should be retained until a new cumulative listing is published.

AD-618 404 Div. 32/4, 26/2
CFSTI Prices: HC$1.00 MF$0.50

Institute for Mathematical Studies in the Social Sciences, Stanford Univ., Calif.
AN INPUT-OUTPUT SYSTEM INVOLVING NON-TRANSFERABLE GOODS.
Technical rept.,
by Michio Morishima and Yasuo Murata. 30 Jun 65,
22p Rept. no. TR-134
Contract Nonr22550, Proj. NR047 004
Unclassified report

Descriptors: (*Industrial production, Mathematical models), (*Management planning, Industrial production), Replacement theory, Economics, Matrix algebra.

The most important characteristics of capital goods

are durability and non-transferability. When time goes on, the number of periods during which a capital good can survive decreases, and it becomes less productive. The other problem relates to the fact that no capital good can be transferred to another industry once it has been installed in some industry. This paper re-examines the dynamic input-output model of Leontief's type from this point of view, and shows how it has to be altered, on the assumptions that there is no technical change and that prices are so flexible as to establish the long-run equilibrium price conditions instantaneously. The authors begin by proving the dynamic substitution theorem, assuming the existence of differentiable general neo-classical production functions, taking vintages of capital goods into explicit account. Then the existence of the golden equilibrium of the model is discussed. (Author)

AD-618 405 Div. 32/4
CFSTI Prices: HC$3.00 MF$0.75

Institute for Mathematical Studies in the Social Sciences, Stanford Univ., Calif.
EMBODIED TECHNICAL PROGRESS IN A MULTI-SECTORAL ECONOMIC GROWTH MODEL.
Technical rept.,
by Yasuo Murata. 24 Jun 65, 93p Rept. no. TR-133
Contract Nonr22550, Proj. NR047 004
Unclassified report

Descriptors: (*Economics, Mathematical models), (*Mathematical models, Economics), Industrial production, Replacement theory, Consumption, Management planning.

The effect of vintage of capital on a multi-sectoral economic growth model is examined. First, the author extends the substitution theorem to a dynamic system where various capital goods are classified not only in terms of their kinds but also in terms of their vintages. With no joint production, each commodity is assumed to have a Cobb-Douglas type of production function which is identical for all different vintages of its capital goods. In a steady-state equilibrium, capital-output ratios (in efficiency units when involving the capital-augmenting technical progress) turn out to be invariant for individual vintages. It is also shown that all capital- and labor-output ratios in the economy take simple and easily calculated functions of only the interest rate and the trend values of technology. Current flow requirements per output, defined as depreciated part of capital goods, vary over time along with the distribution of their vintages. However, in a steady-state equilibrium they take invariant values in the case of no technological change. Second, the author is concerned with the existence of a unique balanced growth of production in our multi-sectoral model, which turns out to be a variant of the dynamic Leontief model. Making use o f the Hawkins-Simon conditions and the Frobenius theorem, we prove the existence of the balanced growth in abstraction from technological change, as well as in the case of technical progress. (Author)

AD-618 426 Div. 32/3, 23/4

Air Force Office of Scientific Research, Washington, D. C.
REPORT ON A CONFERENCE ON THE EDUCATION OF SCIENCE INFORMATION PERSONNEL HELD JULY 27-28, 1964, IN CLEVELAND, OHIO,
by Rowena Swanson. 1965, 1p
Rept. no. AFOSR-65-0859
Proj. 9769
Unclassified report

Pub. in American Documentation v16 n1 p34-5 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Scientific personnel, Education), (*Documentation, Symposia), Training, Libraries, Universities.

Recent progress in the education of science information personnel was the main topic and included discussions of the training of librarians, inter-university efforts and cooperative efforts between universities and industry for program enrichment and on-the job training for students, and the need for more sponsorship of education programs in the information sciences. The conference served as a forum for self appraisal as well as a medium for information exchange. (Author)

AD-618 463 Div. 23/4

Lincoln Lab., Mass. Inst. of Tech., Lexington.
LETTERS, A PARABLE,
by J. J. G. McCue. 1965, 1p
Unclassified report

Pub. in Physics Today Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Physics, Education), (*Education, Physics).

AD-618 474 Div. 30/1, 8/3, 8/7
CFSTI Prices: HC$7.00 MF$1.50

Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
SEMI-ANNUAL RESEARCH SUMMARY (1ST), JULY-DECEMBER 1964 (ELECTRONICS AND ELECTRICAL ENGINEERING).
Progress rept.
1964, 301p
Unclassified report

Descriptors: (*Scientific research, Reviews), (*Electronics, Reviews), (*Electrical engineering, Reviews), (*Control systems, Scientific research), Medical research, Control systems, Electric power production, Energy conversion, Electromagnetic fields, Communication theory, Networks, Electron optics, Millimeter waves, Materials.

Contents: Medical and life sciences; Control and information systems; Electric power systems and energy conversion; Electromagnetic fields; Electronic systems research laboratory; Communication sciences; Nonlinear circuits and systems; Quantum electronics and millimeter waves; Materials.

AD-618 498 Div. 32/8
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
SINO-INDONESIAN RELATIONS: AN OVERVIEW, 1955-1965,
by D. P. Mozingo. Jul 65, 94p Memo no. RM-4641-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*China, Foreign policy), (*Indonesia, Foreign policy), (*Communism, Asia), Political science, Foreign aid, Government(Foreign), Southeast Asia, USSR, United States.

A description is presented of China's relationship with Indonesia since the Bandung Conference of 1955.

It is apparently a harmonious relationship based on mutual foreign policy interests, especially toward the U. S. presence in the Far East. The study discusses the interplay of politics between Peking, Sukarno, and the Communist Party of Indonesia and considers the effects of this rapprochement on Malaysia, as well as the effect on it of the Sino-Soviet dispute. (Author)

AD-618 531 Div. 32/3, 30/2, 32/2
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
NATURAL LANGUAGE PROCESSING AND THE TIME-SHARED COMPUTER.
Professional paper,
by R. F. Simmons. 23 Apr 65, 23p
Rept. no. SP-1974/001/00
Contract SD97
Unclassified report

Presented at the Annual National Colloqium on Information Retrieval (2nd) Univ. of Pennsylvania, Philadelphia, April 23-24, 1965.

Descriptors: (*Language, Processing), (*Statistical analysis, Language), (*Computers, Statistical analysis), Analysis, Reviews, Subject indexing, Classification, Abstracting, Information retrieval.

The time-shared use of large computer systems is making available much larger quantities of random-access memory at a reasonable cost per user. However, difficulties of making text available to computers, and a still limited understanding of language processing technology, suggest that no sophisticated text-processing system is immediately available for a national information center. The state-of-the-art of syntactic, semantic, and discourse analysis is briefly reviewed. It is concluded that these analytic techniques still require much research. Statistical analysis is currently a most useful tool in using computers for automatic indexing, classifying, abstracting, and retrieval. Language processing technology at the statistical level is well developed and affords an interim automation of many text-processing problems but will be greatly aided by the eventual development of adequate analysis at the linguistic and semantic levels. (Author)

AD-618 535 Div. 23/1
CFSTI Prices: HC$4.00 MF$1.00

Ohio State Univ., Columbus.
COMPARISON OF UNITED STATES AIR FORCE OFFICER PROMOTION WITH EXECUTIVE PROMOTION IN BUSINESS.
Master's thesis,
by William Howard Condit, Jr. 1965, 130p
Unclassified report

Descriptors: (*Personnel management, Air Force), (*Officer personnel, Air Force), (*Air Force, Officer personnel), Manpower studies, Air force personnel, Education, Training, Management engineering.

AD-618 536 Div. 28/5, 28/3, 28/1, 23/5, 23/4, 28/2
CFSTI Prices: HC$9.40 MF$2.75

Research and Development Board, Washington, D. C. Working Group on Human Behavior under Conditions of Military Service.
(No Title).
Appendices 1-2, 4-16, 18-25, 27-39.
30 Jun 51, 640p Rept. no. HBM-200/1, app. 1-39
Unclassified report

Descriptors: (*Military psychology, Scientific research), (*Psychology, Military personnel), (*Military personnel, Psychology), Aviation accidents, Stress-(Physiology), Stress(Psychology), Adjustment(Psychology), Recruiting, Military training, Training devices, Fatigue-(Physiology), Attitudes, Vision, Hearing, Behavior, Fear, Motivation, Warfare, Prisoners, Psychometrics, Human engineering, Performance(Human), Abnormal psychology, Manpower studies, Job analysis.

AD-618 537 Div. 28/4, 28/5, 23/5
CFSTI Prices: HC$7.25 MF$2.00

Research and Development Board, Washington, D. C. Working Group on Human Behavior under Conditions of Military Service.
(No Title).
Appendices 40, 42-47, 49-55, 57, 59, 61, 63-65, 72-78.
30 Jun 51, 426p Rept. no. HBM-200/1, app. 40-78
Unclassified report

Descriptors: (*Military psychology, Scientific research), (*Psychology, Military personnel), (*Military personnel, Selection), (*Psychometrics, Military personnel), Aptitude tests, Military training, Personality, Motivation, Adjustment(Psychology), Training devices, Social psychology, Attitudes, Public opinion, Manpower studies, Behavior, Stress(Psychology), Stress(Physiology), Performance(Human), Education, Behavior, Mental disorders, Safety, Pilots.

A brief review is given of the objectives, successes and failures of psychological testing through World War II. The First World War demonstrated the value of general intelligence tests; the second showed that still better prediction could be obtained by proper use of additional tests of special aptitudes. Some thirty distinct special aptitudes have been recognized and a beginning has been made with classifying MOS in groups according to the patterns of special aptitudes involved in them.

AD-618 538 Div. 28/5, 28/2, 28/3, 23/5
CFSTI Prices: HC$7.00 MF$1.75

Research and Development Board, Washington, D. C. Working Group on Human Behavior under Conditions of Military Service.
(No title).
Appendices 79-89, 92, 94, 96-100, 102-105.
30 Jun 51, 363p Rept. no. HBM-200/1, app. 79-105
Unclassified report

Descriptors: (*Military psychology, Scientific research), (*Military personnel, Psychology), (*Psychology, Military personnel), (*Human engineering, Armed Forces-(United States)), Air force equipment, Aviation accidents, Flight instruments, Social psychology, Psychometrics, Military training, Safety devices, Attitudes, Behavior, Motivation, Anxiety, Emotions, Culture, Leadership, Recruiting, Professional personnel, Education, Performance(Human), Fatigue(Physiology), Abnormal psychology, Adjustment(Psychology), Warfare, Males, Females.

AD-618 539 Div. 28/5, 28/3, 23/5
CFSTI Prices: HC$13.90 MF$4.50

Research and Development Board, Washington, D. C. Working Group on Human Behavior under Conditions of Military Service.
(No Title).
Appendices 106-119, 121-126, 128, 130-135.
30 Jun 51, 1090

Rept. no. HBM-200/1, app. 106-135
Unclassified report

Descriptors: (*Military psychology, Scientific research), (*Military personnel, Psychology), (*Psychology, Military personnel), Culture, Sociology, Mental disorders, Hospitals, Human engineering, Tracking, Performance(Human), Stress(Psychology), Stress(Physiology), Social psychology, Officer personnel, Selection, Military training, Group dynamics, Training devices, Job analysis, Warfare, Prisoners, Behavior, Leadership, Attitudes, Personality, Religion, Communism, Propaganda, Fear, Motivation, Education, Public opinion, Psychological warfare.

AD-618 540 Div. 28/5, 28/3, 23/5
CFSTI Prices: HC$13.70 MF$4.50

Research and Development Board, Washington, D. C. Working Group on Human Behavior under Conditions of Military Service.
(No Title).
Appendices 136, 138-143, 146-150, 152-159, 161-163, 165-168, 171-173, 175-192, 194-200.
30 Jun 51, 1070p
Rept. no. HBM-200/1, app. 136-200
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Military psychology, Scientific research), (*Military personnel, Psychology), (*Psychology, Military personnel), Education, Selection, Abnormal psychology, Adjustment(Psychology), Group dynamics, Military training, Training devices, Social psychology, Stress(Psychology), Stress(Physiology), Social communication, Propaganda, Public opinion, Performance(Human), Officer personnel, Job analysis, Vision, Motivation, Fear, Warfare, Prisoners, Attitudes, Behavior, Personality, Leadership, Human engineering, Manpower studies, Mental disorders, Psychometrics, Statistical data.

AD-618 546 Div. 28/5, 33/2, 13/11
CFSTI Prices: HC$4.00 MF$1.00

Oklahoma Univ., Norman.
COMMUNICATION AND DRIVING SAFETY: THE ROLE OF MASS MEDIA AND THE EFFECTS OF POSITIVE AND NEGATIVE SYMBOLISM IN ACCIDENT PREVENTION.
Masters' thesis,
by Gilbert Lee Whiteman. 1965, 119p
Unclassified report

Descriptors: (*Motor vehicle accidents, Propaganda), (*Traffic, Safety), (*Propaganda, Motor vehicle accidents), (*Social psychology, Motor vehicle accidents), Public opinion, Education, Radio broadcasting, Television communication systems, Attitudes, Social communication.

The report analyzes the role of mass media communications in automobile accident prevention. The most effective type of motivation in accident prevention is considered.

AD-618 555 Div. 28/1, 15/1
CFSTI Prices: HC$2.00 MF$0.50

North Carolina State Univ., Raleigh.
A COMPARISON OF THREE MATHEMATICAL LINEAR LEARNING MODELS.
Master's thesis,
by Robert Earl Thornberry. 1965, 34p
Unclassified report

Descriptors: (*Mathematical models, Learning), (*Learning, Mathematical models), Analysis, Probability, Transformations(Mathematics), Matrix algebra.

Mathematical models are being formulated in increasing numbers for use in the systematizing of the study of psychology. One particularly significant group of such models is concerned with the study of learning theory. Three of the learning models presently being used are developed and compared. First, each of the models is separately developed as to its mathematical properties and characteristics. Second, the three models are compared with one another in order to discover if any one is a generalization or a special case of either of the other two. Third, all three are considered simultaneously in order to indicate to what extent and in what manner they are related. (Author)

AD-618 557 Div. 23/1
CFSTI Prices: HC$3.00 MF$0.75

Oklahoma Univ., Norman.
THE COMMUNICATION AND PUBLIC RELATIONS PROBLEMS OF THE AIR FORCE RECRUITER IN OKLAHOMA.
Master's thesis,
by Joe Franklin Marchant. 1965, 82p
Unclassified report

Descriptors: (*Recruiting, Public relations), (*Air Force, Recruiting), Public opinion, Attitudes, Warfare, Air force personnel, Oklahoma, Social communication, Students.

Contents:
Public opinion and the military forces
The origin of recruiting
Recruiting in America
Studying the market
Opinion and attitudes of Oklahoma high school seniors.

AD-618 568 Div. 28/5, 28/4, 12/5
CFSTI Prices: HC$7.00 MF$2.25

Research and Development Board, Washington, D. C. Working group on Human Behavior under Conditions of Military Service.
REPORT OF WORKING GROUP ON HUMAN BEHAVIOR UNDER CONDITIONS OF MILITARY SERVICE,
by Sidney Adams, Jack Buel, Gordon Barclay, and Percival Eaton McDowell. Jun 51, 440p
Rept. no. HBM-200/1
Unclassified report

Prepared in cooperation with Personnel Policy Board, Office of the Secretary of Defense, Washington, D. C.

Descriptors: (*Military psychology, Scientific research), (*Military personnel, Selection), (*Psychology, Military personnel), (*Manpower studies, Military personnel), Military training, Warfare, Psychometrics, Sensory perception, Performance(Human), Mental disorders, Emotions, Motivation, Attitudes, Behavior, Personality, Leadership, Safety, Public relations, Adaptation(Physiology), Adjustment(Psychology), Human engineering, Officer personnel, Job analysis.

Contents: Increasing the effectiveness of combat effort; Personnel policies and research; Mobilization of manpower; Demographic aspects; Human skills and capacities; National character; Mobilization and national community; Optimum utilization; Transition from civilian to military life; Rationale of selection and classification; Psychological and psychiatric selection and classification; Physical examinations and standards;

Sensory abilities; Selection and classification of skills; Preinduction aptitude and occupational evaluation; Selection, classification, and assignment of officers, specialists; and civilian employees; Management practices in personnel operations; Sample problems in adjusting to military life; Military training; Motivation, incentives, and discipline in training; Content methods, and management of training; Utilization of military manpower; Motivation for and adaptation to combat; Rotation and redistribution; Adaptation: Geography, climate, and indigenous population; Leadership; Safety; Human engineering; Proficiency measurement and job analysis; The military group; Organization; Primary groups in stress of combat.

AD-618 569 Div. 28/5

George Washington Univ., Washington, D. C.
THE APPROPRIATE LEVEL OF FRANKNESS IN INTERPERSONAL RELATIONS,
Master's thesis,
by Gilbert Roger Kaats. Jun 65, 178p
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Verbal behavior, Social psychology), (*Social communication, Verbal behavior), Group dynamics, Personality.

Data collected from interviews over a two-year period are presented.

AD-618 580 Div. 28/1, 28/3

Walter Reed Army Inst. of Research, Washington, D. C.
MOTIVATIONAL PROPERTIES OF LONG DURATIONS OF REWARDING BRAIN STIMULATION,
by William Hodos. 1 Jun 64, 6p
Unclassified report

Pub. in Journal of Comparative and Physiological Psychology v59 n2 p219-24 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Brain, Stimulation), (*Behavior, Rats), Motivation, Reaction(Psychology), Intensity, Conditioned reflex, Psychophysiology.

In a shuttle box, 8 rats with electrodes in 6 different rewarding brain areas alternately turned the stimulation on and off. Latency of stimulation termination and latency of next onset were decreasing functions of stimulus intensity. Decreasing onset latencies suggest that long durations of stimulation may not be punishing. In another experiment, 5 rats were trained to press a lever for brain stimulation reward on a progressive ratio schedule. 4 of the rats were tested on durations ranging from 0.15 to 10.0 sec. and a 5th rat was tested on durations as long as 120 sec. In each of these animals, the number of responses in the final rewarded ratio run was an increasing function of intensity. (Author)

AD-618 588 Div. 28/3, 16/15

Office of Aviation Medicine, Federal Aviation Agency, Washington, D. C.
DURATION OF SPIRAL AFTEREFFECT AS A FUNCTION OF RETINAL SIZE, RETINAL PLACE, AND HEMIRETINAL TRANSFER,
by Sheldon L. Freud. 16 Dec 63, 8p
Rept. no. AM-64-9
Unclassified report

Pub. in Perceptual and Motor Skills v18 p47-53 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Afterimages, Measurement), (*Vision, Afterimages), (*Retina, Afterimages), Focusing, Time, Functional analysis, Anatomy, Intensity, Psychophysiology.

This experiment has shown that, although both rods and cones mediate the spiral aftereffect, cone areas give a larger response. Increasing size of the retinal image results in longer durations of SAE but rods are more affected by this increase than are cones. There is a general weakening in aftereffect resulting from 'transfer' from one hemiretina to another with cone areas showing greater loss than rod areas. Size of retinal image was shown to be a potent variable and, in fact, under some small size conditions, normal Ss fail to observe any effect whatsoever. In view of these findings, it is apparent that size of retinal image is a variable which must be carefully controlled if comparable results are to be obtained. Review of the clinical literature, however, reveals that distance from S to spiral and objective spiral size often vary from experiment to experiment. This variation could well account for some of the differences in results of clinical studies. It is proposed that a standard spiral size and testing distance be introduced for clinical use. (Author)

AD-618 589 Div. 28/3, 16/15

Office of Aviation Medicine, Federal Aviation Agency, Washington, D. C.
DURATION AS A MEASURE OF THE SPIRAL AFTEREFFECT,
by Sheldon L. Freud. 11 Sep 63, 5p
Rept. no. AM-64-10
Unclassified report

Pub. in Perceptual and Motor Skills v17 p643-6 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Afterimages, Measurement), (*Vision, Afterimages), Reliability, Functional analysis, Time, Intensity, Rotation, Analysis of variance, Psychophysiology, Retina.

The purpose of this experiment was to study the reliability of duration as a measure of the spiral aftereffect. The results for 10 Ss indicate that duration is a highly reliable measure and that duration is a simple monotonic function of exposure-time. (Author)

AD-618 606 Div. 28/1

Oxford Univ., (England). Inst. of Experimental Psychology.
THE EFFECT OF OVERTRAINING ON A NON-REVERSAL SHIFT IN OCTOPUS,
by N. J. Mackintosh and J. Mackintosh. 28 Feb 63, 5p
Contract N62558 2453
Unclassified report

Pub. in Journal of Genetic Psychology v106 p373-7 1964. (Copies available only to DDC users).

Descriptors: (*Cephalopoda, Training), (*Transfer of training, Learning), Perception(Psychology), Great Britain, Inhibition.

Sixteen octopuses were trained on an orientation discrimination, half of them being trained to criterion only, the other half being given 100 over-training trials. Then they were shifted to a shape discrimination. This discrimination was learned significantly faster by

nonovertrained animals as compared with overtrained animals. Because octopuses as well as rats benefit from overtraining when learning a reversal, the present results indicate that overtraining on one discrimination has an effect on the learning of a second discrimination that is determined by the relationship between the dimensions involved in the two discriminations. (Author)

AD-618 608 Div. 28/1

North Carolina Univ., Chapel Hill.
AN INFORMATION-PROCESSING MODEL OF ONE KIND OF PROBLEM SOLVING,
by Edward S. Johnson. 30 Aug 63, 33p
Grants NIH M1849, AF AFOSR62 5

Unclassified report

Pub. in Psychological Monographs: General and Applied v78 n4 whole n581 p1-31 1964 (Copies not available to DDC or Clearinghouse customers). Prepared in cooperation with Yale Univ., New Haven, Conn. Contract Nonr60920.

Descriptors: (*Learning, Models(Simulations)), (*Models-(Simulations), Learning), Communication theory, Decision making, Pattern recognition, Behavior, Perception-(Psychology).

Solutions to a set of concept-formation problems were secured individually from 11 Ss using a thinking-aloud procedure. The task required Ss to propose a sequence of hypotheses concerning properties which differentiate 1 set of patterns from another set. Verbal transcripts were analyzed in detail for consistencies in the ways in which Ss produce hypotheses. A method of low-level scanning was identified which forms the basis for generating simple hypotheses. More complex (disjunctive and conjunctive) hypotheses were found to be compounded from simple consistencies found in the pattern sets. Points of individual difference relating to the complexity of hypotheses formed, degree of validity checking, persistence, etc., were identified. An information-processing model was constructed which was judged to be successful in the simulation of problem-solving behavior of several Ss on a variety of problems. (Author)

AD-618 677 Div. 23/1
CFSTI Prices: HC$1.00 MF$0.50

Naval Personnel Research Activity, San Diego, Calif.
INFLUENCE OF QUESTIONAIRE ITEMS ON GENERAL ATTITUDE TOWARDS JOB.
Research memo.,
by William H. Githens. Jun 65, 7p
Rept. no. SMR-65-13
Task 3 1607 01 01S2

Unclassified report

Descriptors: (*Naval personnel, Attitudes), Job analysis, Officer personnel, Personnel management.

Three types of questionnaires were distributed to naval officers commissioned from NROTC classes. One type asked for information on only the positive aspects of a naval career; the second type asked for information on only the negative aspects of a naval career; the third type asked for information on both the positive and negative aspects of a naval career. Each officer completed only one of the questionnaires. All questionnaires contained a rating scale for indicating general attitude towards a naval career. There was no difference between questionnaire types in the distribution of marks on the general attitude scale. It was concluded that responding to questions concerning positive or negative aspects of a job does not influence general attitude towards the job. (Author)

06. Biological and Medical Sciences

AD-617 913 Div. 16/10, 25/4
CFSTI Prices: HC$1.00 MF$0.50

Autonetics, Downey, Calif.
OCCUPATIONAL LASER HAZARDS- A SURVEY OF THE LITERATURE,
Rept. for 1956-1965,
by Marnelle Kinney. 7 Jul 65, 23p
Rept. no. T5-1245/3111
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Lasers, Hazards), (*Bibliographies, Lasers), Safety devices, Eye, Vision, Retina, Eye glasses, Protective clothing, Skin, Burns, Tissues(Biology), Pathology, Ophthalmology, Physiology, Industrial medicine, Indexes, Abstracting, Reviews.

The need for guidelines to protect personnel involved in laser research is generally recognized. The literature reveals, however, that views differ as to what precautions should be required. This bibliography contains 48 entries arranged alphabetically by author, and includes papers published in the open literature and reports which may be obtained through the Defense Documentation Center. The period of time covered is from 1956 through May 1965. (Author)

AD-617 963 Div. 16/3, 4/4
CFSTI Prices: HC$3.00 MF$0.75

Monsanto Research Corp., Everett, Mass.
THE BASIS OF STABILITY IN LYSINE AND ARGININE SALTS OF UNSATURATED FATTY ACIDS.
Final technical rept. for May 62-May 64,
by Stanley D. Koch, Asher A. Hyatt, and Delores V. Lopiekes. Apr 65, 95p
Contract DA19 129QM1922N, Proj. 7 84 13 002
USA-NLABS FD-7
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Linoleic acid, Stabilization), (*Fatty acids, Stability), (*Amino acids, Salts), (*Antioxidants, Amino acids), Dehydrated foods, Additives, Preservation, Complex compounds, Electrical conductance, Spectra-(Infrared), Nuclear magnetic resonance, Chromatographic analysis, X-ray diffraction analysis, Crystal lattices, Molecular isomerism, Fatty acid esters.

The mechanism and generality of the known stabilization against autoxidation conferred on linoleic acid by certain basic amino acids, such as lysine and arginine, was investigated. Basic amino acids were the only class of compounds found to confer the effect. However, the smallest basic amino acid, 2, 3-diamino-propionic acid was not effective, nor was a beta, omega-diamino acid, 3,6-diaminohexanoic acid although a simple isomer of lysine. The stabilization was observed only in the solid phase. Inclusion of sodium chloride in the solid matrix was deleterious to the effect. A large number of physical and chemical observations were made and correlated but it was not found possible to draw detailed conclusions about the mechanism of stabilization. On the basis of the reported observations no detailed structure of the stabilized complex can be suggested. The cause of the phenomenon appears to be closely associated with the physical arrangement of the ions in the crystal lattice. (Author)

AD-617 967 Div. 16/15, 28/3
CFSTI Prices: HC$3.00 MF$0.75

TRACOR, Inc., Austin, Tex.
BINAURAL INTERACTION.
Final rept.,
by Bruce H. Deatherage and Donald E. Robinson.
8 Jun 64, 65p Rept. no. TRACOR-64-199-U
Contract Nonr419300, Proj. NR142 177
Unclassified report

Descriptors: (*Hearing, Theory), (*Psychoacoustics, Nervous system), Anatomy, Physiology, Psychology, Auditory perception, Pitch discrimination, Audiometry, Ear.

Knowledge of the mechanisms of binaural interaction is extended. A new attempt is made to outline the problems a theory of binaural interaction must solve.

AD-617 970 Div. 16/3

Air Force Cambridge Research Labs., Bedford, Mass.
MODIFIED PHYCOERYTHRIN FROM PORPHYRIDIUM CRUENTUM TREATED WITH p-CHLORO-MERCURIBENZOATE.
Physical sciences research papers,
by Eiji Fujimori. Apr 65, 10p
Rept. nos. AFCRL-65-278, PSRP-97
Proj. 8659, Task 865903
Unclassified report

Pub. in Nature v204 n4963 p1091-2 Dec 12 1964
(Copies available only to DDC users).

Descriptors: (*Algae, Organic pigments), (*Organic pigments, Absorption spectrum), Photosynthesis, Fluorescence, Proteins(Simple), Globulins, Thiols, Chlorine compounds, Mercury compounds, Benzoates, Glutathione.

Phycoerythrin, pigment-protein complex in photosynthetic organisms, plays a role in photosynthesis in transferring an energy abosrbed by itself to chlorophyll. Previous studies in this laboratory showed that the longest absorption band at 565 millimicrons responsible for fluorescence originates from the interaction between the pigment and SH-group of the protein in phycoerythrin. During the course of investigation on the effect of SH-blocking agent on energy transfer, it was found that modified phycoerythrin is released from cells treated with PCMB. This modified phycoerythrin possesses a single absorption band at 545 millimicrons, while native phycoerythrin shows three absorption bands at 500, 545, and 565 millimicrons. In the glutathione-treated modified phycoerythrin, the highly fluorescent 565 millimicrons chromophore was partially regenerated. This investigaton indicates that native phycoerythrin is composed of two units and that modified phycoerythrin is one of them separated from the other containing the 500 millimicrons chromophore only. (Author)

AD-617 977 Div. 16/4

Alberta Univ., Edmonton. Dept. of Entomology.
A GYNANDROMORPH OF AEDES PUNCTOR (KIRBY) (DIPTERA: CULICIDAE) FROM ALBERTA,
by D. C. D. Happold. 23 Mar 64, 5p
Grant DRB6801 23, Proj. D49 68 01 23
Unclassified report

Pub. in Canadian Entomologist v97 n2 p204-6 Feb 1965 (Copies available only to DDC users).

Descriptors: (*Culicidae, Morphology(Biology)), Canada.

A gynandromorph of Aedes punctor, collected while it was sucking blood, is described and figured. (Author)

AD-617 978 Div. 16/1, 16/3

Goteborg Univ. (Sweden).
OCCURRENCE OF DIHYDROXYPHENYLALANINE DECARBOXYLASE IN NERVES OF THE SPINAL CORD AND SYMPATHETICALLY INNERVATED ORGANS,
by Nils-Erik Anden, Tor Magnusson, and Evald Rosengren. 1965, 9p
Grant AF EOAR64 30, Proj. 9777, Task 977701
AFOSR 65-0960

Unclassified report

Pub. in Acta Physiologica Scandinavica p2-9 1965 (Copies available only to DDC users).

Descriptors: (*Spinal cord, Carboxy-lyases), (*Autonomic nervous system, Carboxy-lyases), (*Carboxy-lyases, Nerves), Phenylalanine, Enzymes, Eye, Rabbits, Levarterenol, Amines, Sweden.

After transection of the rabbit spinal cord the L-3,4-dihydroxyphenylalanine decarboxylase activity in the caudal part was reduced by 90-95 and 75-85 per cent when determined in vitro and in vivo, respectively. The drop appeared to be fastest between the second and fifth day, and the activity reached its minimum level after 3 weeks. In the rabbit iris the dihydroxyphenylalanine decarboxylase activity fell to approximately 10 per cent of that of the control side in 48 hours after the excision of the superior cervical ganglion. In both tissues the time courses of the disappearance of dihydroxyphenylalanine decarboxylase activity and of noradrenaline were very similar but the amine disappeared somewhat more suddenly and rapidly than the enzyme. Preganglionic sympathectomy did not influence the dihydroxyphenylalanine decarboxylase activity in the iris. The nerve trunk contained only 15-20 times higher activity than the iris, why the dihydroxyphenylalanine decarboxylase like noradrenaline probably occurs in the whole neuron but is highly concentrated in the terminals. Postganglionic sympathectomy reduced the dihydroxyphenylalanine decarboxylase activity in the rat submaxillary gland and spleen by 85 and 80 per cent, respectively. (Author)

AD-617 979 Div. 16/3

Children's Hospital, Washington, D. C. Biochemical Research Lab.
PROPOSED MODE OF ACTION OF CORTICOSTEROIDS ON THE CONNECTIVE TISSUE,
by J. C. Houck and Y. M. Patel. 1965, 8p
Grant NIH AM04066, Proj. NR105 325

Unclassified report

Pub. in Nature v206 n4980 p158-60 Apr 10 1965 (Copies available only to DDC users).

Descriptors: (*Corticosteroid agents, Connective tissue), (*Connective tissue, Corticosteroid agents), Skin, Collagen, Enzymes, Peptide hydrolases, Steroids, Ribonucleic acids, Cytoplasm, Aging(Physiology), Rats.

Previously reported changes in dermal chemistry associated with cortisol administration are explained on the basis of: (1) a hormonally potentiated release of a cellular protease into the extracellular compartment of the connective tissue; (2) the limited proteolytic activation of collagenase zymogen by this protease; and (3) the digestion of insoluble collagen by the activated dermal collagenase. The dermal chemical responses of rats to cortisol were inhibited by 'Dilantin' and by age, as was the ability of the steroid to effect the release of cellular protease into the ground substance.

AD-617 980 Div. 16/3

Goteborg Univ. (Sweden). Inst. of Neurobiology.
CHARACTERISTICS OF THE ATP-ASE ACTIVITY OF ISOLATED NEURONS OF RABBIT,
by H. Hillman and H. Hyden. 31 Aug 64, 6p
Grant AF EOAR63 28
AFOSR 65-0958

Unclassified report

Pub. in Histochemie v4 p446-50 1965 (Copies available only to DDC users).

Descriptors: (*Adenosine phosphates, Nerve cells), (*Nerve cells, Adenosine phosphates), Enzymes, Magnesium, Ions, Phosphates, Rabbits, Sweden.

Isolated and homogenised DEITERS' neurons from the lateral vestibular nucleus of rabbit in a Krebs-Ringer solution containing no added Mg(++), 1.3 micro moles/ml and 5 micro moles/ml Mg(++) broke down ATP at the maximal rate of 0.29 ± 0.20, 2.40 ± 0.20, and 5.95 ± 0.63 micro micro moles/cell/hr. In 1.3 mM Mg(++) solution the single cell homogenates took up phosphate at the mean rate of 2.6 ± 0.2 micro micro moles/cell/hr. If the rabbits were injected 1 hour before with 20 mg/kg body weight of 2-amino-1-propene-1,1,3, tricarbonitrile (triap), the breakdown of ATP in these latter media was 0.82 ± 0.44, 2.5 ± 0.60, and 6.7 ± 1.1 micro micro moles/cell/hr, respectively, and the quantity of inorganic phosphate liberated did not decrease. (Author)

AD-617 981 Div. 16/1, 16/3, 16/12

Goteborg Univ. (Sweden).
EVIDENCE FOR A ROLE OF DOPAMINE IN EXTRA-PYRAMIDAL FUNCTIONS,
by A. Carlsson. 1964, 11p
Grant AF EOAR61 44, Proj. 9777, Task 977701
AFOSR 65-0943

Unclassified report

Pub. in Acta Neurovegetativa v26 n4 p484-93 1964 (Copies available only to DDC users).

Descriptors: (*Brain, Amines), (*Amines, Brain), (*Nervous system diseases, Amines), Levarterenol, Biosynthesis, Histochemistry, Reserpine, Phenycalanine, Paralysis, Sweden.

Dopamine (=3-hydroxytyramine) is the immediate precursor in the biosynthesis of noradrenaline. In brain it probably also serves as a neurotransmitter, particularly in the extrapyramidal system. About 80% of the brain dopamine occur in the neostriatum. The intraneuronal localization of dopamine was demonstrated by means of histochemical techniques. Reserpine causes dopamine to disappear from the brain and produces a parkinsonian syndrome. The central actions of reserpine can be partially counteracted by increasing the concentration of dopamine in brain (through administration of the precursor L-3,4-dihydrophenylalanine=L-DOPA). In brains of parkinson patients the concentration of dopamine has been found markedly lowered; the parkinson syndrome is favourably influenced by increasing the dopamine concentration (through L-DOPA administration). (Author)

AD-617 983 Div. 16/1, 16/3, 16/12

Karolinska Inst., Stockholm (Sweden).
UPTAKE OF L- AND D-ISOMERS OF CATECHOL-AMINES IN ADRENERGIC NERVE GRANULES,
by U. S. von Euler and F. Lishajko. 28 Jun 63, 6p
Grant AF EOAR62 14, Proj. 9777, Task 977701
AFOSR 65-0945
Unclassified report

Pub. in Acta Physiologica Scandinavica (Sweden) v60 p217-22 1964
(Copies available only to DDC users).

Descriptors: (*Nerve cells, Amines), (*Levarterenol, Molecular isomerism), (*Epinephrine, Molecular isomerism), (*Amines, Nerve cells), Adenosine phosphates, Absorption(Biological), Sweden.

The spontaneous depletion of endogenous noradrenaline (NA) from bovine splenic nerve granules is diminished or prevented by incubation with either L-NA or D-NA. However, the effect observed following the addition of L-NA is significantly greater than that produced by the D-isomer. No significant difference is observed between the uptake of the two isomers of adrenaline (A) in undepleted granules. The enhanced uptake of A or NA is a concentration of 10 micro-g/ml in the presence of adenosine triphosphate (ATP) similarly did not differ for the L- and D-isomers of the amine. However, the ATP-dependent uptake at an amine concentration of 1 micro-g/ml was 2-3 times as high for L-NA and L-A than for the D-isomers. It is concluded that the ATP-dependent uptake in nerve granules of NA and A at low amine concentrations is to some extent stereospecific, while the amine-uptake at higher concentrations with and without added ATP is not or only slightly dependent on the steric configuration. (Author)

AD-617 985 Div. 16/3

Johns Hopkins Univ., Baltimore, Md. Dept. of Biophysics.
A DEMONSTRATION OF CODING DEGENERACY FOR LEUCINE IN THE SYNTHESIS OF PROTEIN,
by Bernard Weisblum, Fabio Gonano, Gunter von Ehrenstein, and Seymour Benzer.
23 Dec 64, 8p
Contract AF49 638 1304
AFOSR 65-0956
Unclassified report

Research supported in part by National Institutes of Health, Bethesda, Md., and National Science Foundation, Washington, D. C.
Pub. in Proceedings of the National Academy of Sciences v53 n2 p328-34 Feb 1965 (Copies available only to DDC users).

Descriptors: (*Proteins, Biosynthesis), (*Genetics, Proteins), (*Amino acids, Genetics), (*Ribonucleic acids, Genetics), Nucleotides, Peptides, Hemoglobin, Ribosomes, Chromatographic analysis.

Different leucine sRNA's in E. coli are separable by countercurrent distribution. When these sRNA's are used as donors of labeled leucine during the synthesis of rabbit hemoglobin, in vitro, they distribute leucine differently into various peptides of the alpha-chain. One of the sRNA's introduces leucine only into a single position. The results indicate that there are at least two distinct codons for leucine in the amino acid code. (Author)

AD-617 990 Div. 16/3, 16/2

Leicester Univ. (England)
FINE CONTROL OF PHOSPHOPYRUVATE CARBOXY-LASE ACTIVITY IN ESCHERICHIA COLI,
by J. L. Canovas and H. L. Kornberg. 7 Dec 64, 4p
Grants AF EOAR63 17, B SR652, Proj. 9777, Task 977701
AFOSR 65-0957
Unclassified report

Pub. in Biochimica et Biophysica Acta v96 p169-72 1965 (Copies available only to DDC users).

Descriptors: (*Eschirichia coli, Carboxy-lyases), (*Carboxy-lyases, Eschirichia coli), Bacteria, Metabolism, Enzymes, Coenzymes, Organic phosphorus compounds, Pyruvates, Adenosine phosphates, Bacterial extracts, Labeled substances, Great Britain.

Previous studies with mutants of Salmonella typhimurium and Escherichia coli, which fail to grow on glucose-salts media unless such media are supplemented with intermediates of the tricarboxylic acid cycle or direct precursors thereof, have shown that the carboxylation of phosphoenolpyruvate (CH2=C.(COOH).O.PO3H2 + CO2 yields HOOC.CH2.CO.COOH + Pi) is necessarily involved in the maintenance of the tricarboxylic acid cycle: this reaction serves to replenish the cycle with C4-compounds, as intermediates of that cycle are revoved in the course of biosynthesis. It was difficult to explain why CoASAc and citrate synthase should be so much more efficient a trapping agent for labelled oxaloacetate than was malate dehydrogenase and NADH2, even when the extracts were supplemented with crystalline malate dehydrogenase: this observation suggested that CoASAc played a role in this system additional to its function as a trapping agent. This suggestion was confirmed with a mutant AB1623 of E. coli K-12.

AD-617 991 Div. 16/3, 16/1, 16/4

Lund Univ. (Sweden).
A DETAILED METHODOLOGICAL DESCRIPTION OF THE FLUORESCENCE METHOD FOR THE CELLULAR DEMONSTRATION OF BIOGENIC MONOAMINES,
by Bengt Falck and Christer Owman. 1965, 25p
Grants AF EOAR64 5, PHS NB05236 01, Proj. 9777, Task 977701
AFOSR 65-0959
Unclassified report

Pub. in Acta Universitatis Lundensis, Sectio II Medica, Mathematica, Scientiae Rerum Naturalium n7 p1-23 1965 (Copies available only to DDC users).

Descriptors: (*Amines, Histological techniques), (*Histological techniques, Amines), (*Cells(Biology), Amines), (*Serotonin, Histological techniques), Phenols, Tissues(Biology), Fluorescence, Microscopy, Freeze drying, Sweden.

A methodological description gives detailed instructions for the preparation, freeze-drying, histochemical treatment, and sectioning of tissues for fluorescence microscopy of catecholamines, 5-hydroxytryptamine and their immediate precursors. (Author)

AD-618 000 Div. 16/1, 16/12

Massachusetts Inst. of Tech., Cambridge.
RESPONSES OF SINGLE DORSAL CORD CELLS TO PERIPHERAL CUTANEOUS UNMYELINATED FIBRES,
by Lorne M. Mendell and Patrick D. Wall. 1964, 6p
Contracts DA36 039AMC03200E, AF33 615 1747
Unclassified report

Pub. in Nature v206 n4979 p97-9 Apr 3 1965
(Copies available only to DDC users).

Descriptors: (*Nerve cells, Reflexes), (*Nerve fibers, Stimulation), (*Nerve impulses, Nerve fibers), Cats.

The fundamentally different effects of A and C stimulation on the DLC cells are emphasized. The A fibres after a short intense burst turn the cell off, which is probably the result of the negative feedback exerted by the A's on themselves as seen by the negative dorsal root potential. The C fibres, on the other hand, turn the postsynaptic cell on after the repetitive discharge, which may be the effect of the positive feedback of the C's on the A's as seen by the positive dorsal root potential. It is evident from these results that both A and C fibres converge on many of the dorsal horn cutaneous cells. Furthermore, the C fibres produce a disproportionately large delayed discharge. There are prolonged inhibitory and excitatory effects after the arrival of mixed volleys. Therefore, the overall pattern will depend on the balance between the numbers of myelinated and unmyelinated fibres carrying the afferent volley.

AD-618 062 Div. 16/11
CFSTI Prices: HC$1.00 MF$0.50

Army Environmental Hygiene Agency., Edgewood Arsenal Md.
PRIMARY IRRITATION EVALUATION PROGRAM.
Annual rept. for 1963-64,
by Herbert E. Christensen, Thomas E. Davis, Virginia L. Zaratzian, Robert M. Carter, and Charles E. Engberg. 1965, 11p

Unclassified report

Descriptors: (*Toxicity, Organic compounds), Skin, Eye, Irritating agents, Edema, Necrosis, Ulcers, Cornea, Wounds + injuries, Tests, Rabbits.

Studies were conducted to classify chemical compounds according to primary skin- and eye-irritant effects on albino rabbits so that development research can proceed without undue hazard to personnel. Chemicals received for toxicologic evaluation were tested for primary skin irritation. From results of the tests, the respective chemicals were classified according to established 'Primary Skin Irritation Categories'. All compounds which produced no skin irritation and other compounds of special interest were tested further for injury to the eyes. Chemicals are classified according to established 'Eye Injury Categories'.

AD-618 082 Div. 16/4, 25/1, 2/5
CFSTI Prices: HC$6.00 MF$1.25

General Electric Co., Schenectady, N.Y. Advanced Technology Labs.
FOREST SOUND SPECTRUM ANALYSIS,
by R. B. Tatge. 20 Apr 65, 241p
Contract DA18 001AMC514X

Unclassified report

Descriptors: (*Jungles, Acoustics), (*Acoustics, Jungles), (*Ecology, Panama), Humans, Animals, Noise, Noise analyzers, Spectrum analyzers, Data processing systems.

An experiment was conducted on Barro Colorado Island, Panama Canal Zone, to determine the effect of human intrusion on the naturally occurring noise of a tropical jungle. Controlled tests were run to determine whether the animals responded to human activity, and whether ambushers could be detected in hiding. All data were tape-recorded at a base facility several thousand feet from the microphones. The recording system, including microphones, was flat from 10 cps to 100 kc. The tapes were analyzed both by listening and by study of visual records produced on a real-time spectrum analyzer. In these visual records the display is presented in a format having time as one axis, frequency the other, and intensity proportional to the logarithm of signal amplitude. Patterns thus produced are uniquely identified with particular species of animals; the pattern sequence in time gives the history of the sounds produced by each species which was calling. The spectrum analyses showed no general change in signal amplitude at any frequency due to intrusion, but several birds which normally live in the lower stratum of the forest changed their rate of call-production (generally, a decrease) under conditions of human activity. The rate stayed low for almost an hour after people were active; the effect was virtually the same whether the intruders went into hiding or actually vacated the area. More prolonged tests than were run would be required to establish with certainty whether ambushers could be detected after they had been in hiding for more than an hour. Limited data indicate that ambushers would continue to cause the indicators' rate of call-production to be depressed below that which would be expected under undisturbed conditions. (Author)

AD-618 108 Div. 16/10, 16/11, 16/13
CFSTI Prices: HC$1.00 MF$0.50

Stanford Medical Center, Palo Alto, Calif.
METABOLIC EFFECTS OF BLOOD TRANSFUSION.
Progress rept. for 1 Jul 64-30 Jun 65,
by John P. Bunker. 30 Jun 65, 5p
Contract DA49 193MD2135

Unclassified report

Descriptors: (*Blood transfusion, Metabolism), Heart, Pathology, Acidosis, Barbiturates, Calcium, Ions, Potassium, Phosphates, Sodium compounds, Citrates, Cardiac glycosides, Blood circulation, Shock(Pathology), Transplantation, Ballistocardiography, Analog computers, Drugs, Ph, Dogs.

Contents:
Effect of metabolic acidosis on myocardial contractility
Interaction between pentobarbital and decreased calcium ion on guinea pig atria
The ultra-low frequency ballistocardiogram in dogs after autotransplantation of the heart
Estimation of stroke volume by analog computer solution of the Starr ballistic formula.

AD-618 109 Div. 16/11, 16/10

Stanford Medical Center, Palo Alto, Calif.
INTERACTION BETWEEN PENTOBARBITAL AND DECREASED CALCIUM ION ON GUINEA PIG ATRIA,
by N. Ty Smith and Aldo N. Corbascio. 1964, 16p
Contract DA49 193MD2135

Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Barbiturates, Calcium), (*Anesthetics, Blood circulation), Heart, Pathology, Ions, Drugs, Blood transfusions, Membranes(Biology), Guinea pigs.

By the method of isobolographic projection, the interaction of pentobarbital and decreased calcium ion was studied on the isometric and isotonic contrations of ten electrically driven or spontaneously beating guinea pig atria. Synergism (potentiation) was present at all effect levels with all parameters in electrically driven atria. In spontaneously beating atria, the synergism present at lower levels shifted to antagonism at higher effect levels. In describing the interaction between two drugs, the investigator must define the effect level. The mechanism of this synergistic interaction is probably the postulated action of calcium and pentobarbital on the same membrane sites, plus a possible chelation of calcium by anesthetic

agents. The results suggest that some anesthetic agents may considerably modify the circulatory effects of rapid, massive blood transfusions. (Author)

AD-618 110 Div. 16/13, 16/11, 16/10, 16/1

Stanford Medical Center, Palo Alto, Calif.
THE ULTRA-LOW FREQUENCY BALLISTOCARDIOGRAM IN DOGS AFTER AUTOTRANSPLANTATION OF THE HEART,
by N. Ty Smith, Edward J. Hurley, and Aldo N. Corbascio. 1965, 8p
Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Heart, Transplantation), (*Transplantation, Heart), (*Ballistocardiography, Transplantation), Extremely low frequency, Pharmacology, Physiology, Cardiovascular system, Arrhythmia, Levarterenol, Cardiac glycosides, Dogs.

The ULF BCG was studies in six dogs 6-15 days after autotransplantation of the heart. In spite of the anticipated effects of denervation and traumatic surgery, the records were very nearly normal in five of the six dogs. The major abnormalities in the five dogs were underdeveloped H and K waves, plus a large diastolic filling wave. The records were quite similar to human tracings. It is suggested that the BCG may be an advantageous method for daily monitoring of patients after cardiac homotransplantation, since it would be possible to detect the rejection phenomenon in time to start immunosuppressive therapy. (Author)

AD-618 111 Div. 16/7, 16/1, 30/2
CFSTI Prices: HC$1.00 MF$0.50

Stanford Medical Center, Palo Alto, Calif.
ESTIMATION OF STROKE VOLUME BY ANALOG COMPUTER SOLUTION OF THE STARR BALLISTIC FORMULA,
by N. Ty Smith, Gerald J. Fleischli, and Aldo N. Corbascio. 1963, 14p
Unclassified report

Descriptors: (*Ballistocardiography, Analog computers), Heart, Medical equipment, Electronic recording systems, Blood circulation, Stimulation, Drugs, Arrhythmia, Programming(Computers).

A program for the analog computer solution of the Starr BCG formula is presented. The most important contribution of this method is the use of relays to select any wave or set of waves of the BCG. t therefore has applications in other analyses of the BCG. Comparisons with dye-dilution cardiac outputs in dogs under various circulatory conditions shows faithful reproduction of changes in stroke volume. The advantages and disadvantages of the method are discussed. (Author)

AD-618 114 Div. 16/10, 16/1
CFSTI Prices: HC$7.00 MF$2.00

Western Reserve Univ., Cleveland, Ohio.
School of Medicine.
THE PHYSIOLOGY OF PROLONGED OLIGEMIC HYPOTENSION.
Annual progress rept. for 1 Jun 64-31 May 65,
by F. A. Simeone. 31 May 65, 369p
Contract DA49 193MD2022
Unclassified report

Descriptors: (*Hypotension, Pathology), Blood volume, Blood circulation, Hemorrhage, Heparin, Shock(Pathology), Cardiovascular system, Levarterenol, Blood proteins, Lymphatic system, Enzymes, Metabolism, Urine, Dextran, Starches, Histamine, Liver, Histology, Pharmacology, Sympatholytic agents, Adenosine phosphates, Erythrocytes, Dogs, Humans, Physiology.

Physiologic and biochemical data were recorded from animals and man in shock. Studies in Animals: Hemorrhagic hypotension: (1) Studies of the splanchnic and hepatic circulation; (2) Cardiovascular dynamics in dogs; (3) Changes in erythrocyte volume; (4) Studies of proteins and enzymes in the lymph and plasma; (5) Effects of phenoxybenzamine; (6) Effects of Adenosine Triphosphate; (7) Treatment of hemorrhagic shock with dextran and hydroxyethyl starch; (8) Histamine and histidine decarboxylase in the liver in hemorrhagic hypotension; (9) Effects of dextran and phenoxybenzamine. Studies in Man: (1) Hemodynamic changes; (2) Metabolic findings; (3) Blocking agents in shock; (4) Changes in enzymes and the serum.

AD-618 119 Div. 16/2

Sir William Dunn School of Pathology, Univ. of Oxford (England).
SPECIFIC PRECOCIOUS PROTECTIVE ACTION OF TOXOIDS,
by Jane Mellanby and W. E. van Heyningen. 1964, 3p
Contract N62558-2281, Proj. NR103 474
Unclassified report

Pub. in Nature, v203 n4942 p312-3 Jul 18 1964 (Copies available only to DDC users).

Descriptors: (*Toxins + antitoxins, Vaccines), (*Vaccines, Toxins + antitoxins), Clostridium, Clostridium tetani, Clostridium welchii, Corynebacterium diphtheriae, Corynebacterium, Diseases, Dosage, Mice, Guinea pigs, Great Britain.

AD-618 142 Div. 16/10, 16/2, 16/9, 32/1

Naval Medical Research Unit No. 2, Taipei (Taiwan).
ABSTRACTS OF PAPERS PRESENTED BY STAFF OF NAMRU-2 BEFORE THE ANNUAL MEETING OF THE FORMOSAN MEDICAL ASSOCIATION (56th), TAIPEI, 23-24 NOVEMBER 1963.
1963, 15p
Unclassified report

Pub. in Journal of the Formosan Medical Association v62 n12 p1-14 1963 (Copies available only to DDC users).

Descriptors: (*Medical research, Taiwan), (*Taiwan, Medical research), Reports, Abstracting, Ecology, Japanese B encephalitis virus, Oxidoreductases, Tissue culture cells, Chlamydia trachomatis, Histological techniques, Hepatitis viruses, Pathology, Cholera, Fluorides, Water supplies, Diet, Nutrition, Methionine, Vitamins, Growth, Deficiency diseases, Hemoglobin, Color vision, Humans, Rats, Monkeys.

AD-618 151 Div. 16/7

National Research Council of Canada, Ottawa (Ontario).
Div. of Applied Physics.
EEG, SEG OR SONAR,
by David M. Makow. 1965, 1p Rept. no. NRC-8465
Unclassified report

Pub. in Ultrasonics v3 p100-1 Apr-Jun 1965 (Copies available only to DDC users).

Descriptors: (*Electroencephalography, Ultrasonic radiation), Brain, Electronic recording systems, Canada.

AD-618 152 Div. 16/3

Atlantic Regional Lab., Halifax (Nova Scotia).
ISOPHENOXAZINE SYNTHASE APOENZYME FROM PYCNOPORUS COCCINEUS,
by P. M. Nair and L. C. Vining. 23 Sep 64, 10p
NRC 8321

Unclassified report

Pub. in Biochimica et Biophysica Acta v96 p318-27 1965 (Copies available only to DDC users).

Descriptors: (*Fungi, Enzymes), (*Enzymes, Fungi), (*Oxidoreductases, Fungi), Vitamin B complex, Phosphates, Manganese, Ions, Nucleotides, Amines, Oxidation, Phenols, Thiols, Canada.

A crystalline preparation of the apoenzyme of isophenoxazine synthase (2-aminophenol:O2 oxidoreductase) was obtained from Pycnoporus coccincus. The holoenzyme was reconstituted by addition of riboflavin 5'-phosphate and Mn(2+). Flavin-adenine dinucleotide did not serve as a cofactor. Conversion of o-aminophenol to 2-amino-3H-isophenoxazin-3-one was stoichiometric and in the absence of Mn(2+) required approx. I mole of riboflavin 5'-phosphate acted as a catalyst. Incubation of the enzyme with o-aminophenol generated thiol groups and also made the reaction susceptible to inhibition by sulfhydryl reagents. A variety of reducing substances repressed the activity of the enzyme; inhibition by ascorbic acid could be reversed by increasing the concentration of riboflavin 5'-phosphate and Mn(2+). The reaction was also inhibited by substrate at concentrations above 0.6 mM. (Author)

AD-618 159 Div. 16/3, 16/2

National Research Council of Canada, Ottawa (Ontario). Div. of Biosciences.
A DIETHER ANALOG OF PHOSPHATIDYL GLYCEROPHOSPHATE IN HALOBACTERIUM CUTIRUBRUM,
by M. Kates, L. S. Yengoyan, and P. S. Sastry.
26 Jun 64, 18p Rept. no. NRC-8285

Unclassified report

Pub. in Biochimica et Biophysica Acta v98 p252-68 1965 (Copies available only to DDC users).

Descriptors: (*Bacterial extracts, Phosphates), (*Phosphates, Bacterial extracts), (*Phospholipids, Bacterial extracts), Organic phosphorus compounds, Ethers, Molecular structure, Spectra(Infrared), Nuclear magnetic resonance, Mass spectrum, Chromatographic analysis, Canada.

The major phosphatide in the extremely halophilic bacterium, Halobacterium cutirubrum, was isolated by a combination of solvent fractionation, precipitation through the barium salt, and final purification as the sodium salt. Analytical and degradative data showed the phosphatide to be a phosphatidyl glycerophosphate with two long-chain ether groups instead of fatty acid ester groups. Both long-chain groups were found to be identical and were shown by comparison of infrared, nuclear magnetic resonance, and mass spectra with those of dihydrophytyl derivatives to have the structure 3,7,11,15-tetramethylhexadecyl. The two long-chain groups are joined by ether linkages to the alpha, beta-positions of L-glycerol. Possible biochemical and physiological functions of this unusual phosphatide in the halophile cell are discussed. (Author)

AD-618 160 Div. 16/3

Atlantic Regional Lab., Halifax (Nova Scotia).
CINNAMIC ACID HYDROXYLASE IN SPINACH,
by P. M. Nair and L. C. Vining. 21 May 64, 9p
NRC 8111

Unclassified report

Pub. in Phytochemistry v4 p161-8 1965(Copies available only to DDC users).

Descriptors: (*Plants(Botany), Enzymes), (*Enzymes, Plants(Botany)), Coenzymes, Inhibition, Catalysis, Phenylalanine, Tyrosine, Canada.

An acetone precipitate from an extract of spinach leaves catalysed the hydroxylation of trans-cinnamic acid to p-coumaric acid. The enzyme was unstable and could not be purified. Crude preparations had a pH optimum of 4.6 and showed an absolute requirement for an external electron donor. Tetrahydrofolic acid and a reduced pyridine nucleotide coenzyme were necessary for maximum activity. Aminopterin was a potent inhibitor of the hydroxylating system. No requirement for metal ions could be demonstrated but inhibition by p-chloromercuribenzoate suggests that a sulfhydryl group participates in the reaction. These properties, and the course of the reaction when cofactors were added separately, indicate a similarity between this enzyme and the phenylalanine hydroxylase of mammalian liver. The crude spinach preparation also catalysed and the conversion of L-phenylalanine to tyrosine, and addition of L-phenylalanine inhibited cinnamic acid hydroxylase activity. (Author)

AD-618 161 Div. 16/3

Atlantic Regional Lab., Halifax (Nova Scotia).
PHENYLALANINE HYDROXYLASE FROM SPINACH LEAVES,
by P. M. Nair and L. C. Vining. 8 Sep 64, 12p
NRC 8334

Unclassified report

Pub. in Phytochemistry v4 p401-11 1965 (Copies available only to DDC users).

Descriptors: (*Plants(Botany), Enzymes), (*Enzymes, Plants(Botany)), (*Phenylalanine, Catalysis), Tyrosine, Biosynthesis, Inhibition, Reaction kinetics, Coenzymes, Canada.

Spinach leaves contain an enzyme system which catalyses the hydroxylation of L-beta-phenylalanine to tyrosine. The crude active extract has been partially purified by fractional precipitation with acetone, adsorption on DEAE-cellulose, and with calcium phosphate gel. Such preparations showed a 66-fold increase in specific activity. The optimum pH of the reaction was at 4.2. Only L-phenylalanine and L-p-fluorophenylalanine among the compounds tested were substrates of the enzyme system and each was converted to tyrosine. Cinnamic acid was not hydroxylated. No requirement for metal ions could be demonstrated. The partially purified system showed an absolute requirement for electron donors which was satisfied by adding tetrahydrofolic acid and a reduced pyridine nucleotide. The latter could be replaced by ascorbic acid, and the former by an extract of spinach leaves. The active factor in the extract was not obtained pure but behaved as expected for a pteridine derivative during fractionation. The enzyme system was inhibited by concentrations of L-phenylalanine above 1000 M. Aminopterin, cinnamic acid, p-chloromercuribenzoate and sulfhydryl-containing compounds also inhibited the reaction. A kinetic study suggested that the enzyme system from spinach which hydroxylates phenylalanine is similar to that isolated from animal liver. (Author)

AD-618 162 Div. 16/4

National Research Council of Canada, Ottawa (Ontario). Div. of Biosciences.
THE ABSENCE OF ELASTIC DEFORMATION IN DRIED BENT CELLULOSE MICROFIBRILS IN PLANT CELL WALLS,
by J. Ross Colvin. 9 Nov 64, 9p Rept. no. NRC-8274
Unclassified report

Pub. in Canadian Journal of Botany v43 p339-43 1965
(Copies available only to DDC users).

Descriptors: (*Cell wall, Elasticity), (*Cellulose, Cell wall), Plants(Botany), Cell structure, Morphology-(Biology), Deformation, Synthesis, Recrystallization, Canada.

A small fraction of individual cellulose microfibrils in plant cell walls show appreciable bending along a portion of their length in a plane tangential to the cell surface. Segments of such curved microfibrils from transverse sections of Avena coleoptile epidermal or parenchyma cells do not straighten when they are freed from the constraints imposed by adjacent microfibrils, amorphous cell wall constituents, or the embedding medium. The curvature of these segments is not affected by immersion in cold water for 30 minutes, in hot water for 10 minutes, or in steam at 100 degrees for 10 minutes. The results indicate that there is no elastic deformation of bent cellulose microfibrils in dried plant cell walls. The curvature of the microfibrils in the absence of elastic deformation suggests either (a) that cellulose microfibrils may be synthesized in a bent strain-free condition or (b) that cellulose microfibrils are synthesized in a straight form, followed by elastic deformation with subsequent release of strain by recrystallization on drying. (Author)

AD-618 172 Div. 16/13, 16/10

Walter Reed Army Inst. of Research, Washington, D. C.
THE INFLUENCE OF EXTRACORPOREAL HANDLING OF BLOOD ON HEMORRHAGIC SHOCK IN DOGS,
by Robert M. Hardaway, Dale G. Johnson, Donald N. Houchin, Edward B. Jenkins, and John W. Burns. 1965, 11p
Unclassified report

Pub. in Experimental Medicine and Surgery v23 n1 Jan 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Blood coagulation, Shock(Pathology)), (*Shock(Pathology), Blood coagulation), (*Blood transfusions, Blood coagulation), Containers, Surfaces, Plastics, Metals, Glass, Air, Heparin, Fibrinogen, Toxicity, Hypotension, Blood vessels, Surgical techniques, Dogs.

Summary and conclusions: (1) Activation of surface clotting factors during extracorporeal handling of blood will greatly increase the mortality in hemorrhagic shock in dogs. (2) With careful handling of the blood exposing it only to plastic surfaces and avoiding metal, glass and air, dogs may be maintained for long periods at low pressures without the onset of irreversible shock. (3) Saline is non-toxic and quite helpful in hemorrhagic shock, whereas surface activated blood is toxic. Saline replacement is better than surface activated blood in treatment of hemorrhagic shock in dogs. (4) Heparin will prevent death in irreversible hemorrhagic shock and ameliorate the toxic effect of surface activated blood in dogs. (5) Mortality in dogs is correlated with fibrinogen utilization and a prolonged silicone clotting time. (6) Animals in hemorrhagic hypotension are predisposed to intravascular coagulation as compared with normal animals. (7) Irreversibility is correlated with the occurrence of an episode of disseminated intravascular coagulation (DIC). (Author)

AD-618 174 Div. 16/1, 16/15, 28/3

Walter Reed Army Inst. of Research, Washington, D. C.
VISION,
by John C. Armington. 1965, 20p
Unclassified report

Pub. in Annual Review of Physiology v27 p163-82 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Vision, Physiology), Biophysics, Eye, Visual acuity, Visual perception, Color vision, Retina, Adaptation(Physiology), Sensitivity, Psychophysiology, Sensory deprivation, Vertebrates, Reviews.

Contents: Biophysics; Physiological nystagmus; Retinal image; Retinal optics; Microdensitometry; Reflection densitometry; Flash bleaching; Electrophysiology of vision; Origin of excitation; Excitation in the vertebrate retina; Vertebrate spike potentials; External electroretinogram; Human electroretinogram; Retina and higher centers; Development and visual deprivation; Response averaging; Methods of interpreting and analyzing visual data; Duplicity theory; Systems analysis.

AD-618 175 Div. 16/10, 20/6

Walter Reed Army Inst. of Research, Washington, D. C.
LONG-LIVED ELECTRON SPIN RESONANCES IN RATS IRRADIATED AT ROOM TEMPERATURE,
by Harold M. Swartz. 27 Aug 64, 8p
Unclassified report

Pub. in Radiation Research v24 n4 p579-86 Apr 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Radiobiology, Magnetic resonance), (*Magnetic resonance, Dosimeters), (*Bone, Radiation effects), Tissues(Biology), Gamma rays, Radiological dosage, Dose rate, Spectroscopy, Nuclear magnetic resonance, Legs, Rats.

The prolonged existence of radiation-induced unpaired electron species in the femurs of living rats has been demonstrated by ESR techniques. These findings appear to have signficance in both radiobiological theory and dosimetry of radiation accidents. (Author)

AD-618 176 Div. 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
THE APPLICATION OF DEL RIO HORTEGA'S SILVER METHOD TO EPON-EMBEDDED TISSUE,
by Peter J. Goldblatt and Benjamin F. Trump. 1965, 11p
Grant E201
Unclassified report

Pub. in Stain Technology v40 n3 p105-15 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Histological techniques, Biological stains), (*Biological stains, Histological techniques), Tissues(Biology), Dyes, Silver compounds, Carbonates, Osmium compounds, Sodium compounds, Oxides, Pyridines, Formaldehyde, Cytoplasm, Nuclei(Biology).

Os04-fixed, Epon- or Araldite-embedded tissue can be stained by the silver amminocarbonate method of del Rio Hortega. Sections, 0.5-1.5 microns thick, are floated on the silver solution and impregnated for 0.5-2 hr at 60 C. Pyridine, 1-2 drops/10 ml of staining solution, facilitates the staining. Reduction in 1% formalin and fixation by Na2Sa203 are optional. Staining may be influenced by the buffering vehicle in the fixative and appears to be dependent on sites of osmium binding. Cytoplasmic processes and basement membranes are well stained, as are intracytoplasmic organelles. Nuclear and nucleolar staining is variable. (Author)

AD-618 177 Div. 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
STUDIES ON NECROSIS OF MOUSE LIVER IN VITRO. ULTRASTRUCTURAL ALTERATIONS IN THE MITOCHONDRIA OF HEPATIC PARENCHYMAL CELLS,
by Benjamin F. Trump, Peter J. Goldblatt, and Robert E. Stowell. 1965, 28p
Grant E201

Unclassified report

Pub. in Laboratory Investigation v14 n4 p343-71 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Liver, Necrosis), (*Mitochondria, Pathology), Histology, Biochemistry, Cells(Biology), Cell structure, Tissues(Biology), Histological techniques, Morphology(Biology), Membranes(Biology), Granules, Phosphorylation, Succinates, Glutamine, Oxidoreductases, Electron microscopy.

Electron microscopic alterations of mitochondria of mouse hepatic parenchymal cells during the development of necrosis in vitro are described and correlated with biochemical and histochemical observations. The earliest alteration, occurring after 15 min. incubation, is loss of the matrical granules. It is suggested that this change reflects depression in the rate of oxidative phosphorylation. The next alteration, beginning at 30 min. and fully developed at 1 hr., is swelling of the matrix compartment. The decrease in relative density of the matrix may reflect both influx of water and loss of solutes. Later alterations in mitochondria include vesiculation, distortion and fragmentation of membranes, and the appearance of large, characteristic aggregations of dense material in the matrix. These changes increase progressively to 24 hrs. The degree of alteration in mitochondrial ultrastructure appears to be closely correlated with the total activities of succinoxidase and glutamic dehydrogenase, as measured biochemically. The ultrastructural alterations in mitochondria could not, on the other hand, be correlated with the activities of succinic and glutamic dehydrogenases as demonstrated histochemically. (Author)

AD-618 180 Div. 16/4

Communicable Disease Center, Atlanta, Ga.
A NEW SPECIES OF MALLOPHAGA FROM THE MIKADO PHEASANT,
by K. C. Emerson and C. J. Stojanovich. 1964, 4p
Research rept. no. MR005.09-1601.3.28
Proj. MR005 09, Task MR005 09 1601 3 28

Unclassified report

Pub. in Entomological News v75 n10 p256-8 Dec 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Lice, Morphology(Biology)), Parasites, Males, Females, Birds.

AD-618 182 Div. 16/8

Naval Medical Field Research Lab., Camp Lejeune, N. C.
TREADMILL FOR SMALL LABORATORY ANIMALS. Final rept.,
by Robert James Andrews. 24 Aug 64, 6p
Vol. 15/No. 18
NAVMED MF002.03.04-8005

Unclassified report

Pub. in Journal of Applied Physiology v20 n3 p572-4 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Laboratory equipment, Laboratory animals), (*Laboratory animals, Exercise), Rats, Biochemistry, Metabolism, Medical research.

A treadmill for exercising small laboratory animals is described. Belt speed can be varied in steps from 13 to 70 ft/min; inclination can be varied from 0 to 16 degrees. The apparatus can be locally constructed of surplus laboratory materials and scrap for an estimated cost of $300. It is being satisfactorily used by the Physiology Division of the Naval Medical Field Research Laboratory, Camp Lejeune, North Carolina for biochemical studies utilizing white rats. (Author)

AD-618 183 Div. 16/11, 15/2

Harvard Univ., Cambridge, Mass.
STOCHASTIC APPROXIMATION TO THE MEDIAN EFFECTIVE DOSE IN BIOASSAY.
Rept. for 1 Jun 63-31 May 64,
by William G. Cochran and Miles Davis. 1963, 21p
Contract Nonr186637, Proj. NR042 097

Unclassified report

Pub. in Stochastic Models in Medicine and Biology p281-300 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Dosage, Effectiveness), (*Biological assay, Stochastic processes), Permissible dosage, Numerical analysis.

The ideas of stochastic approximation are used in the hope of developing experimental methods for estimating the median effective dose.

AD-618 187 Div. 16/4, 2/9

Lehigh Univ., Bethlehem, Pa.
PROTEOLYTIC BACTERIA FROM THE BERMUDA AREA, G16,
by Joseph R. Merkel. 1964, 1p
Contract Nonr61005

Unclassified report

Pub. in Bacteriological proceedings 1965. (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Marine biology, Bacteria), (*Bacteria, Bermuda), Distribution, Collecting methods, Algae, Culture media, Morphology(Biology), Peptide hydrolases, Sounds.

Studies on the distribution and activity of proteolytic marine bacteria which began last year in the Chesapeake Bay were continued in the Bermuda area. Water samples were collected at various depths from Devil's Hole in Harrington Sound, 1 mile offshore, and from a deep-sea hydrostation, 20 miles from shore. Samples (8 to 22 ml) were passed through sterile Millipore filters, and the filter pads were incubated on nutrient agar-seawater

medium. Colonies were counted, and those which were morphologically different were isolated, and their ability to digest algal chromoproteins was tested. The total number, variety, and number of proteolytically active bacteria were higher in the inshore waters than in the deep-sea waters. Of the inshore marine isolates, 60 to 76% produced proteases; 27 to 35% of the isolates from the deep sea waters were proteolytic. In deep waters, larger numbers of bacteria occurred at the surface and near the thermoclines than at intermediate depths. A similar distribution of bacteria and blue-green algae was observed in Harrington Sound. Studies on the general characteristics and proteases of marine bacteria collected in the vicinity of Bermuda have been undertaken. (Report quoted in its entirety.)

AD-618 224 Div. 16/8, 9/1
CFSTI Prices: HC$2.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
THE DEVELOPMENT OF A VOLUME-CYCLED RESPIRATOR,
by James W. Joyce, Jr. 24 Mar 65, 49p
Rept. no. TM-65-14
Proj. 31000

Unclassified report

Descriptors: (*Respirators, Control systems), (*Control systems, Fluid flow), Volume, Performance-(Engineering), Design, Power, Pneumatic systems.

A volume-cycled respirator, powered and controlled by a bistable fluid amplifier, was designed and developed to satisfy a set of predetermined requirements. A working prototype was tested in the laboratory to evaluate its performance on an engineering basis. The results indicate that this device generally satisfies the requirements imposed on it. Medical evaluation of the unit will provide the final decision as to its usefulness. (Author)

AD-618 232 Div. 16/1

University of Southern California, Los Angeles. School of Medicine.
Gm GENES AND GAMMA (G)-GLOBULIN SYNTHESIS IN THE HUMAN FETUS,
by L. Martensson and H. H. Fudenberg.
26 Aug 64, 7p
Contract Nonr365612; Grant PHS HE05997,
Proj. NR105 308

Unclassified report

Pub. in Journal of Immunology v94 n4 p514-20 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Gamma globulin, Embryos), Genetics, Synthesis, Antingen + antibodies, Immunity, Blood serum, Immune serums.

By means of highly specific typing systems for genetic gamma globulin factors, evidence has been obtained that the human fetus may synthesize small amounts of gamma (G)-globulin. A comparison of the Gm(a) and Gm(b) titers of sera from adults suggests that the two genes, Gm(a) and Gm(b), do not synthesize the same relative amounts of gamma-globulin at different stages of ontogenetic development. Some, but not all, of the maternal anti-Gm's that sediment as 7 S gamma-globulin in density gradient experiments are also detectable in the fetal circulation. (Author)

AD-618 239 Div. 16/3, 16/9

Oxford Univ. (England).
VISUAL ACUITY OF ESSENTIAL FATTY ACID-DEFICIENT RATS,
by A. R. Hands, N. S. Sutherland, and W. Bartley.
6 Apr 64, 5p
Contract N62558 2453

Unclassified report

Pub. in Biochemical Journal (Gt. Britain) v94 p279-83 1965 (Copies available only to DDC users). Prepared in cooperation with Sheffield Univ. (England).

Descriptors: (*Rats, Visual acuity), (*Visual acuity, Fatty acids), (*Fatty acids, Visual acuity), Deficiency diseases, Nutrition, Diet, Vitamin A, Retina, Liver, Illumination, Great Britain.

Rats were maintained on a diet deficient in fat and on a normal diet of rat cubes. Rats were trained to discriminate between vertical and horizontal striations. The minimal stripe width that could be used for discrimination was determined. In bright illumination (0.7 or 4.5 ft.lamberts) both deficient and normal rats had the same ability to discriminate between black and white stripes. With an illuminance of 0.002 ft.lambert, supplemented rats could discriminate as efficiently as at 0.7 ft.lambert, but deficient animals were unable to discriminate at 0.002 ft.lambert. Control rats had 14% of docosahexaenoic acid in their retinal fats but the deficient rats had only 1%. Deficient animals had no vitamin A stores in the liver whereas the control animals had about 190 i.u./g. The visual acuity of the rats used was about 45 degrees of arc. (Author)

AD-618 241 Div. 16/3, 4/4

Pomona Coll., Claremont, Calif. Dept. of Physics.
ELECTRON PARAMAGNETIC RESONANCE IN SPINACH CHLOROPLASTS AT LOW TEMPERATURE,
by Power Sogo, Russell Faucett, and Thomas Holzer.
1965, 4p
Contract Nonr402800; Grant NIH 2G945,
Proj. NR304 473

Unclassified report

Pub. in Nature v204 n4963 p1076-8 Dec 12 1964 (Copies available only to DDC users).

Descriptors: (*Chlorophylls, Paramagnetic resonance), (*Photosynthesis, Paramagnetic resonance), (*Paramagnetic resonance, Chlorophylls), Plants(Botany), Cells(Biology), Low-temperature research.

Initial results are given of an examination of electron paramagnetic resonance signals from unpaired electrons involved in the energy conversion processes of photosynthesis.

AD-618 243 Div. 16/13, 14/8, 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
STUDIES ON POLYMER IMPLANTS IN HUMANS,
by Frank B. Johnson. 1965, 3p

Unclassified report

Pub. in Plastics in Surgical Implants. Special Technical Publication no. 386 p102-4 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Plastic surgery, Materials), (*Prosthetics, Blood vessels), (*Polymers, Prosthetics), Cellulosic plastics, Dacron, Nylon, Orlon, Polyethylene plastics, Halocarbon plastics, Thrombosis, Hemorrhage, Tolerances(Physiology), Tissues(Biology), Neoplasms, Humans.

The clinical, gross and microscopic findings in cases of

plastic implanatation in humans for vascular prosthesis and for plastic surgery have been reviewed. Reactions to the following materials are included: Cellophane, Dacron, Nylon, Orlon, polyethylene, and Teflon. The plastic implants are associated with varying intensities of imflammatory reaction and fibrosis. The principal causes of functional failure are thrombosis, hemmorrhage, and excessive fibrosis. At times the hemorrhage can be shown to be due to fragmentation of the plastic with loss of mechanical integrity. No specific or characteristic inflammatory lesions were found to be due to any particular plastic. None of the tissues showed evidence of malignant changes. (Author)

AD-618 254 Div. 16/10

Civil Aeromedical Research Inst., Oklahoma City, Okla.
IRON HEMATOXYLIN CHELATES. I. THE WEIL STAINING BATH,
by Gene R. Berube, Margaret M. Powers, and George Clark. 1964, 10p
Unclassified report

Pub. in Stain Technology v40 n2 p53-62 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Biological stains, Preparation), (*Histological techniques, Biological stains), Nerves, Ph, Temperature, Time, Iron compounds, Complex compounds.

The procedure for the preparation of the staining solution for the Weil myelin sheath stain was systematically varied in respect to pH, concentration, time, temperature, and relative proportions of the ingredients. The results were explainable on the basis of the presence of a number of iron hematoxylin chelates in the staining bath. Compounds of the form of (Fe sub n Hem)(m+) are nuclear stains, those of the form of (FeHem sub n)(m±) are myelin sheath stains while the precipitate is probably (Fe sub n Hem sub y) sub x (m±). The following procedure for the stain is recommended. Mix equal portions of a 0.25% solution of ripened hematoxylin prepared from a 10% alcoholic solution and 1% ferric ammonium sulphate and use immediately. Preferably, the solutions should be at a temperature of about 5C and the staining done in the refrigerator, but room temperature may be used. Higher temperatures are contraindicated. Hematein should not be substituted for ripened hematoxylin; the resulting stains are too weak to be usable. The absorbance of hematein is no measure of the concentration of the component that stains myelin sheaths. Hematein apparently consists largely of a sparingly soluble highly colored inactive compound. (Author)

AD-618 259 Div. 16/1

Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
NEW DEVELOPMENTS IN HIGH PRESSURE LIVING,
by George F. Bond. 12 Nov 64, 7p
Rept. no. 442; Vol. 23/No. 24
NAVMED MR005.14-3100-3.04
Unclassified report

Pub. in Archives of Environmental Health v9 p310-4 Sep 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Closed ecological system, Underwater), (*Respiration, Closed ecological systems), Life support, Hélium, Oxygen, Pressure, Compressed air, Breathing apparatus, Diving, Submarines, Decompression, Stress-(Physiology), Helium group gases, Rats, Humans, Reviews.

In presenting a discussion of the atmospheric problems inherent in a closed ecological system (submarine, spacecraft, some industrial plants), the author recounts his experiences in Project Genesis I. Experimental animals were exposed first to compressed air then to various synthetic atmospheres. It was established that 100% oxygen was lethal; that a nitrogen-free atmosphere produced no adverse physiological effects. Various proportions of helium and oxygen were tried. After two years of experimentation, it was established that all animals exposed to a selected mixture of helium, oxygen, and lesser quantities of inert gases, not only survived a 14-day exposure at a simulated depth of 200 feet, but could be safely returned to sea level with no physiological damage. Decompression schedules in a separate series of experiments. Studies with human subjects came next, in three phases: at ambient pressure, at 100 foot and then 200 foot equivalents, breathing an atmosphere composed of 3.5% oxygen, 4.5% nitrogen, and 92% helium. No deleterious effects were found; the only problems were heat loss and difficulty in speech communication. (Author)

AD-618 260 Div. 16/1, 16/12

Instituto de Neurologia, Montevideo (Uruguay).
CENTRIFUGAL CONTROL OF COCHLEAR INFLOW (Control Centrifugo del Influjo Coclear),
by R. Velluti, W. Buno, and Garcia-Austt. 1964, 2p
Grants AF AFOSR312 63, NIG NB04382 01,
Proj. 9777, Task 977701
AFOSR 65-0966
Unclassified report

Pub. in Congreso de la Asociacion Latinoamericana de Ciencias Fisiologicas (6th), Vina del Mar (Chile), 23-28 Nov 64.

Descriptors: (*Auditory nerve, Stimulation), Ear, Guinea pigs, Conditioned reflex, Maghetic tape.

Results are presented for 59 experiments conducted on 42 guinea-pigs. The guinea-pigs were awake and free, with permanent electrodes implanted in the middle ear near the round window. In most experiments the ear-bones were removed, and the acoustic stimuli was delivered by an earphone connected to the middle ear through an implanted tube. Cochlear microphones and action potentials of the auditory nerve were recorded on magnetic tape. Continuous averaging of 35 to 40 responses was performed with a photo-optic-electronic method. (Author)

AD-618 262 Div. 16/2, 16/3

Saskatchewan Univ., Saskatoon. Dept. of Bacteriology.
BOUND WATER, METABOLITES AND GENETIC CONTINUITY,
by S. J. Webb. 1964, 11p
Unclassified report

Pub. in Nature v203 n4943 p374-7 Jul 25 1964 (Copies available only to DDC users).

Descriptors: (*Bacteria, Mutations), (*Genetics, Biochemistry), Enzymes, Proteins, Synthesis, Desoxyribonucleic acids, Ribonucleic acids, Escherichia coli, Dehydration, Metabolism, Stability, Amino acids, Glycolysis, Humidity, Inositols, Lactose, Cancer, Mammals, Spores, Canada.

The purpose of the paper was to examine the mutagenic action of desiccation, and to describe the findings which seem to shed some light on the mechanism of enzyme induction, protein and DNA replication, and the method

by which the DNA code functions. The experiments confirmed the following facts: (a) Desiccation at certain relative humidity-levels, ultra-violet irradiation and X-ray are all lethal and mutagenic. (b) The efficiency of the latter two agents on semi-dried cells is also dependent on relative humidity. (c) Protection appears to rely on the right compound in the right place or on strategically placed -OH groups such as in inositol. (d) Protection against all three agents is afforded cells by the same compounds. (e) The action of inoisitol seems to be to replace water and some metabolites. (f) The gene or genes controlling certain physiological functions can be protected by the metabolites themselves or inositol. (g) The genes for many metabolic pathways appear to be in linear array. (h) The replication of DNA requires 'early' protein syntheses. (i) The addition of such compounds as chloramphenicol prevents the synthesis of biologically active protein, stops the production of mutants and protect cells against desiccation.

AD-618 263 Div. 16/2, 16/3, 16/10

Saskatchewan Univ., Saskatoon. Dept. of Bacteriology.
BOUND WATER, INOSITOL, AND THE EFFECT OF X-RAYS ON ESCHERICHIA COLI,
by S. J. Webb and M. D. Dumasia. 11 May 64, 9p
Proj. D52 18 50 04
Unclassified report

Pub. in Canadian Journal of Microbiology v10 p877-85 1964
(Copies available only to DDC users).

Descriptors: (*Radiation effects, Escherichia coli), (*Radiobiology, Dehydration), (*Radioprotective agents, Inositols), X rays, Humidity, Stability, Biochemistry, Canada.

Aerosols of Escherichia coli B were subjected to 250 kv X-rays. It was found that maximal X-ray damage occurred at 70 to 80% relative humidity (R.H.). At these R.H. values only the water bound directly to cell macromolecules remains, and if the water layers were increased by using higher humidities, X-ray damage decreased. Also, at R.H. levels below 70% a sharp decrease in the sensitivity of the cells to the radiation occurred. Several chemicals known to protect cells against desiccation, ultraviolet, and X-ray damage were examined and of these i-inositol proved the most successful. The difference in the protective ability of these various compounds indicated that some protect cells against desiccation damage by retaining water, others by replacing bound-water molecules in macromolecular structure but those retaining water will not protect against X-rays. The results suggest that the physical removal or ionization of a strategic bound-water molecule by X-rays causes most of the cell deaths rather than ionizations occurring in the free water as the presence of the latter appears to offer cells a measure of protection. (Author)

AD-618 265 Div. 16/2

Charleston Coll., S. C.
METHOD FOR DETECTING AND ISOLATING PROTEOLYTIC MARINE BACTERIA,
by Joseph R. Merkel. 20 Nov 64, 2p
Contracts Nonr243901, Nonr61005
Unclassified report

Pub. in Journal of Bacteriology v89 n3 p903-4 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Marine biology, Bacteria), (*Bacteria, Culture media), Sea water, Proteins, Peptide hydrolases, Algae, Gelatins.

A method for detection and primary isolation of marine proteolytic bacteria was suggested from studies on the release and degradation ofth the chromoproteins (phycocyanin and allophycocyanin) of the red alga Porphyra (Merkel, Braithwaite, and Kritzler, J. Bacteriol. 88:974, 1964). The procedure employs either nutrient agar or 0.5% peptone-2% agar medium prepared with seawater, to which enough algal chromoprotein is added to impart color. Proteolysis is detected by observing the decoloration of the medium in zones surrounding active colonies. This is possible because a correlation exists between the loss of chromophore color and protein degradation.

AD-618 269 Div. 16/10, 16/3

Columbia Univ., New York. Coll. of Physicians and Surgeons.
THE SIGNIFICANCE OF GLYCOLYSIS,
by Samuel Graff, Hermann Moser, Olga Kastner, Ada M. Graff, and Myron Tannenbaum. 9 Jul 64, 10p
Contract Nonr26676; Grant DRG2871 T
Unclassified report

Pub. in Journal of the National Cancer Institute v34 p511-9 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Cancer, Glycolysis), (*Glycolysis, Cancer), Metabolism, Lactic acid, Glucose, Lactates, Hormones, Desoxyribonucleic acids, Ribonucleic acids, Tissue culture cells, Growth, Membranes(Biology), Permeability.

L929 mouse fibroblasts and Ehrlich ascites cells grew well in media containing very low levels of glucose. The generation rates of the cultures were independent of glucose concentration and glucose consumption. At low levels of glucose, 5 mg per 100 ml or less, both lines of cells consumed rather than produced lactate. The administration of relatively high levels of glucose to these cells sharply inhibited deoxyribonucleic acid and ribonucleic acid synthesis and generation rates. It is concluded that aerobic glycolysis is a general and transitory defense against high glucose influx. This defense mechanism manifests itself in vitro because the requisite hormones limiting the flux of glucose across cell membranes are either absent or nonoperative. It is surmised that aerobic glycolysis is exhibited in vivo only by those cells refractory to glucose flux regulation--cancer cells. (Author)

AD-618 280 Div. 16/1

Frost Engineering Development Corp., Denver, Colo.
A REVIEW OF RESTRAINT SYSTEMS TEST METHODS,
Final rept. for Oct 62-Aug 63,
by Ernest L. Stech. 26 Sep 63, 12p
Contract AF33 657 9514, Proj. 6301, Task 630102
AMRL TR-65-109
Unclassified report

Pub. in American Society of Mechanical Engineers, Journal as paper number 63-WA-279 p1-9 1963 (Copies not available to DDC or Clearinghouse customers). Prepared for presentation at the Winter Annual Meeting, Philadelphia, Pa., November 17-22, 1963, of the American Society of Mechanical Engineers.

Descriptors: (*Acceleration tolerance, Safety harness), (*Safety harness, Acceleration tolerance), Reviews, Stress(Physiology), Anthropometry, Damping, Vibration, Frequency, Resonance, Accelerometers, Mathematical models, Anatomical models, Tolerances(Physiology), Mechanical properties, Test methods, Animals, Humans.

Restraint test methods are reviewed with reference

to a mathematical model of the dynamics of the human body. This approach is suggested so that the mechanical characteristics of restraint systems can be evaluated in terms of their influence on the dynamic response of the human body in any acceleration environment. Anthropomorphic dummies, animals, live humans and human cadavers are discussed with respect to their advantages and disadvantages in restraint system tests. The concepts of injury risk, subject variability, and dynamic and anatomical differences between animal and human subjects are considered. The available methods for restraint tests are discussed in terms of the amount and kind of information generated and a test technique is recommended. (Author)

AD-618 345 Div. 16/1

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
SPIKE DISCHARGE PATTERNS OF SPONTANEOUS AND CONTINUOUSLY STIMULATED ACTIVITY IN THE COCHLEAR NUCLEUS OF ANESTHETIZED CATS,
by R. R. Pfeiffer and N. Y-S. Kiang. 7 Oct 64, 16p
Contract DA36 039AMC03200E; Grant NSF GP2495
Unclassified report

Prepared in cooperation with Eaton-Peabody Laboratory of Auditory Physiology, Mass. Eye and Ear Infirmary, Boston.
Pub. in Biophysical Journal v5 n3 p302-16 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Auditory nerve, Stimulation), Ear, Nerve fibers, Nerve impulses, Nuclei(Biology), Sensitivity, Cats.

Interspike interval histograms of spontaneous and stimulated activity were computed from spike discharges of single units in the cochlear nucleus. These histograms indicate that a number of different types of spontaneous discharge patterns exist in the nucleus. The type of spontaneous activity of a given unit is related to its activity in response to continuous tones. Correlations were found between the discharge patterns of units and their anatomical locations within the nucleus. (Author)

AD-618 350 Div. 16/8, 16/1, 16/10

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
AN INSTRUMENT FOR THE TOTALIZATION OF HEARTBEATS AND RESULTS OF ITS APPLICATION,
by A. E. Brown, M. Friedman, and R. H. Rosenman.
1963, 3p
Unclassified report

Pub. in Aerospace Medicine v36 n4 p319-21 Apr 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Pulse rate, Electrocardiography), (*Electrocardiography, Pulse rate), Cardiovascular diseases, Heart, Diseases, Medical equipment, Measurement, Interference, Tests.

The Heartbeat Totalizer was used in a research program concerned with the number of heartbeats occurring in 24 hrs. in three groups of subjects. It was found that a group of subjects selected on the basis of a strong sense of time urgency (Type A) would show a 400- to 700-per cent greater incidence of clinical coronary artery disease than people exhibiting the converse behavior pattern (Type B). It was found that the average daily heart rat rate appeared to be about the same for all categories of subjects except those who had suffered from a previous infarction and were experiencing symptoms. This latter group had a faster heart rate. Heartbeat totals ranging from 110,000 to 125,000 for a 24 hr. period were generally encountered. In general, the system was quite insensitive to interference. Details are presented describing measurement techniques, design considerations, and electrode placement of the newly-developed heartbeat measurement instrument.

AD-618 411 Div. 16/4, 16/2
CFSTI Prices: HC$4.00 MF$1.00

Maryland Univ., College Park. Dept. of Zoology.
INDEX CATALOGUE TO RUSSIAN, CENTRAL AND EASTERN EUROPEAN, AND CHINESE LITERATURE IN MEDICAL ENTOMOLOGY. VOLUME VI. BACTERIAL AND SPIROCHAETAL DISEA SES.
1965, 142p
Contract DA49 193MD2238
Unclassified report

See also AD-609 045.

Descriptors: (*Disease vectors, Indexes), (*Bacteria, Diseases), (*Spirochaeta, Diseases), Arthropods, Bacillus anthracis, Brucella, Cholera, Corynebacterium diphtheriae, Muscidae, Actinobacillus, Staphylococcus, Listeria, Mycobacterium leprae, Pasteurella, Diplococcus, Salmonella, Streptococcus, Clostridium tetani, Mycobacterium tuberculosis, Leptospira, Borrelia, Parasites, Veterinary medicine, Catalogs, USSR, Eastern Europe, China.

AD-618 416 Div. 16/1
CFSTI Prices: HC$2.00 MF$0.50

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EXPERIMENTAL DETERMINATION OF HUMAN VESTIBULAR SYSTEM RESPONSE THROUGH MEASUREMENT OF EYEBALL COUNTERROLL.
Master's thesis,
by Victor L. Hartzler and Philip A. Roccaforte.
1965, 42p Rept. no. GE/EE/65-11
Unclassified report

Descriptors: (*Acceleration tolerance, Vestibular apparatus), (*Vestibular apparatus, Acceleration tolerance), Eye, Motion, Rotation, Vision, Performance(Human), Stress(Physiology), Semicircular canals, Mathematical models, Fourier analysis, Graphics, Tables.

An indirect measurement of the human vestibular system response was obtained through the measurement of eyeball counterroll. Human subjects were rotated about an axis through their line of sight at angular velocities varying from 0-30 rpm. The right eye was photographed and the angle of eyeball counterroll was determined by an optical correlation process. A mathematical model was formulated using Fourier curve fitting techniques. This model indicated that subjects with normal vestibular function demonstrate an eyeball counterroll which is a function of angular velocity and position with respect to the vertical. Subjects with known vestibular defects demonstrated a small counterroll. (Author)

AD-618 421 Div. 16/1
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
ATD PRESS. FUNCTIONS OF THE ORGANISM UNDER CONDITIONS OF AN ALTERED GAS ENVIRONMENT.

Special issue, vol. 3, no. 240.
10 Jun 65, 32p

Unclassified report

Descriptors: (*Respiratory system, Atmosphere), (*Stress(Physiology), Respiratory system), Respiration, Barometric pressure, Gas analysis, Decompression, Decompression sickness, Gas embolism, Cardiovascular system, Oxygen, Nervous system, Lungs, Hypoxia, Space medicine, Abstracting, USSR.

The report contains 27 abstracts of selected articles devoted to problems of respiratory physiology. Emphasis is placed on problems connected with increased barometric pressure. Several articles deal with the theoretical aspects of decompression sickness. Other articles are concerned with the problem of the toxic effects of oxygen particularly those functional changes which occur when the effect of oxygen is not accompanied by convulsions. Still other articles deal with the mechanical effects of pressure during abrupt decompressions, the effects of rarefied atmospheres on the central nervous system, problems related to the use of pressurized respiratory equipment, and, finally, the use of helium in respiratory mixtures.

AD-618 434 Div. 16/3, 4/4

Duke Univ., Durham, N. C.
SOME RADIATION EFFECTS ON DNA AND ITS CONSTITUENTS,
by Walter Gordy, Brenda Pruden, and Wallace Snipes.
11 Feb 65, 7p
Grants AF AFOSR493 64, DA AROD31 124G428
AROD 4131:9

Unclassified report

Pub. in Proceedings of the National Academy of Sciences v53 n4 p751-6 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Desoxyribonucleic acids, Radiation damage), (*Radiation damage, Desoxyribonucleic acids), Pyrimidines, Nucleoxides, Hydrogen, Free radicals, Chemical reactions, Nuclear magnetic resonance, Polymerization, Purines.

ESR evidence indicates that hydrogen-addition reactions on the ringed groups, especially on the thymine ring, are possibly of great significance in radiation damage to DNA. The production of secondary free radicals in DNA by H-addition reactions depends upon physical conditions as well as upon chemical impurities and probably on the nature and constitution of DNA itself, i.e., upon the relative amounts and the sequence of the different nucleotides in the DNA polymer and upon the number of its strands, whether single or double. (Author)

AD-618 435 Div. 16/3, 4/4

Duke Univ., Durham, N. C.
ELECTRON SPIN RESONANCE OF AN IRRADIATED SINGLE CRYSTAL OF THYMIDINE,
by Brenda Pruden, Wallace Snipes, and Walter Gordy.
23 Feb 65, 9p
Grants AF AFOSR493 64, DA AROD31 124G428
AROD 4131:8

Unclassified report

Pub. in Proceedings of the National Academy of Sciences v53 n5 p917-24 May 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nucleotides, Radiation damage), (*Pyrimidines, Radiation damage), (*Radiation damage, Pyrimidines), Nuclear magnetic resonance, Desoxyribonucleic acids, Single crystals, Hydrogen, Chemical reactions, Atomic orbitals, Free radicals, Absorption spectrum.

From ESR measurement of gamma-irradiated single crystals of thymidine, the principal, long-lived free radical produced by the irradiation is shown to be a secondary one formed by a hydrogen atom addition reaction on the C(6) of the thymidine ring. The unpaired electron is in a pi orbital of the ring with 0.70 of its spin density on C(5). A similar free radical gives rise to the thymidine-like resonance observed in DNA. (Author)

AD-618 441 Div. 16/1

Johns Hopkins Univ., Baltimore, Md.
EFFECTS OF EXTERNAL ELASTIC AND THRESHOLD LOADING ON BREATHING IN MAN,
by S. Freedman and Stephen A. Weinstein. 9 Jul 64, 4p
Contract Nonr401007; Grant PHS HE01929,
Proj. NR102 101

Unclassified report

Pub. in Journal of Applied Physiology v20 n3 p469-72 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Respiration, Adaptation(Physiology)), Loading(Mechanics), Learning, Thresholds(Physiology), Physiology.

Conscious human subjects, seated in a soundproof chamber, were made at intervals to inspire through external elastic or threshold loads for from 4 to 15 breaths. With threshold loading of -5 to -15cm H2O (13 subjects) initially, the first loaded breath was smaller than preceding breaths with tidal volume returning to normal within 6 breaths. With further presentations, tidal volume returned to control values sooner. After six presentations, 10 subjects had no diminution in tidal volume on the first loaded breath. With elastic loading, of 10 cm H2O/liter (five subjects) and 19.5 cm H2O/liter (four subjects) a different type of adaptation occurred. This was characterized by decreased tidal volume and increased frequency. With the larger load, after three presentations frequency was increased during loaded breathing, due to a conscious effort by the subjects. The results show that repeated presentation of an elastic or threshold load leads to a change in the response to the load in a manner analogous to the learning of voluntary motor acts. (Author)

AD-618 445 Div. 16/10, 16/1

Army Research Inst. of Environmental Medicine, Natick, Mass.
A CLINICAL STUDY OF ACUTE MOUNTAIN SICKNESS,
by William H. Hall, Timothy Barila,
Eldon C. Metzger, and K. K. Gupta. 21 Aug 64, 7p

Unclassified report

Prepared in cooperation with Walter Reed Army Inst. of Research, Washington, D. C.; Army Natick Labs., Mass.; Defence Inst. of Physiology and Allied Sciences, Delhi (India).
Pub. in Archives of Environmental Health v10 p747-53 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Mountains, Hypoxia), (*Hypoxia, Mountains), Medical research, Diagnosis, Metabolic diseases, Potassium, Respiration, Urine, Pathology, Medical examination, Stress(Physiology), Acclimatization, Performance(Human), India.

Acute mountain sickness results from hypoxia, but the pathophysiology remains obscure. Some persons experience symptoms at elevations as low as 6,000 feet above sea level. Virtually all unacclimatized persons transported rapidly to altitudes of 15,000 feet or higher are affected. The cardinal manifestations are headache, breathlessness, and impaired capacity for exertion. These may be so severe and affect such a large proportion of exposed persons, that the effective performance of an unacclimatized group taken rapidly to high mountain altitudes will be markedly impaired. There is rapid clinical improvement, but full recovery of work performance equal to that at sea level is achieved slowly, if at all. Observations were made in collaboration with the Indian Armed Forces Medical Service of a group of 20 unacclimatized soldiers taken within 24 hours from sea level to a camp in the Himalayas at 17,000 feet. All experienced acute mountain sickness. The peak in incidence and severity was 48 hours after arrival at altitude. At this time, 18 of the 20 men were sufficiently ill that their overall performance capability was judged grossly impaired. There was rapid improvement, with only five such cases remaining on the fifth day.

AD-618 446 Div. 16/11, 16/2

Walter Reed Army Inst. of Research, Washington, D. C.
MODE OF ACTION OF CHLOROQUINE,
by Jennie Ciak and Fred E. Hahn. 1965, 1p
Unclassified report

Pub. in Federation Proceedings v24 n2 Mar-Apr 1965
(Copies not available to DDC or Clearinghouse customers)

Descriptors: (*Antimalarials, Biochemistry), (*Chinchona alkaloids, Biochemistry), (*Cermicides, Chinchona alkaloids), (*Bacillus, Metabolism), Antimetabolites, Desoxyribonucleic acids, Biosynthesis, Proteins, Nucleotides, Labeled substances.

The antimalarial drug, chloroquine (CQ), inhibited growth and multiplication of Bacillus megaterium. Addition of CQ to exponentially growing cultures had the following effects: growth, measured turbidimetrically, was strongly inhibited and ceased after 1/3 of a duplication time. Viability declined exponentially. Synthesis of DNA was inhibited completely; the amount of DNA per aliquot of bacteria remained constant. Protein synthesis as indicated by incorporation of C-14-phenylalanine was very strongly inhibited and ceased after less than 1/3 of a duplication time. The bacterial content in global RNA decreased by 12 % during one duplication time. MAK-column analysis of phenol-extracted nucleic acids from CQ-exposed B. megaterium revealed a marked decrease in the amounts of ribosomal RNA; material eluting in the 4s region was a prominent fraction. When C14-labelled uracil or uridine were supplied to cultures following the addition of CQ, only slight radioactivity was found in the 16-23s region of elution diagrams while more radioactivity was present in the 4s material. Inhibition of DNA synthesis and breakdown of ribosomal RNA probably explain the bactericidal action of CQ. (Report quoted in its entirety).

AD-618 450 Div. 16/4

Civil Aeromedical Research Inst., Oklahoma City, Okla.
A SELF-LIMITING, HIGHLY SELECTIVE CHROMIUM-HEMATOXYLIN STAIN,
by Gene R. Berube, Margaret M. Powers, and George Clark. 1965, 5p
Unclassified report

Prepared in cooperation with Army Research Inst. of Environmental Medicine, Natick, Mass.
Pub. in Stain Technology v40 n3 p165-8 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Biological stains, Preparation), (*Chromium compounds, Biological stains), (*Organic pigments, Biological stains), Complex compounds, Nuclei(Biology), Coloring, Histological techniques, Ammonium compounds, Sulfates.

A compound, which is probably a cationic chelate, can be isolated as a dry powder from a hematoxylin-chrome alum lake. In aqueous acid solution this compound is an excellent nuclear stain which is extremely selective, very resistant to acids and alcohols, and self-limiting. Staining time may vary from 20 min to 16 hr without causing significant differences in staining intensity. To prepare the dry stain, dissolve 10 gm of hematoxylin, 10 gm of NaOH and 70 gm of chrome alum in 600 ml of distilled water, boil 20 min, cool and filter, allowing the filtrate to drop into 3.5 liters of absolute alcohol. Filter off the precipitate formed in the alcohol, and air dry it at room temperature. The staining solution is prepared by dissolving 3 gm of the dried precipitate in 100 ml of 3% HCl. (Author)

AD-618 467 Div. 16/2, 16/11
CFSTI Prices: HC$3.00 MF$0.75

Aerospace Technology Div., Library of Congress, Washington, D. C.
CBE FACTORS.
Annotated bibliography on surveys of Soviet-Bloc scientific and technical literature.
16 Jul 65, 78p Rept. nos. ATD-B-65-43; 1
TT 65-62674
Unclassified report

Descriptors: (*Bacterial aerosols, Bibliographies), (*Chemotherapeutic agents, Bibliographies), (*Aerosols, Bibliographies), (*Microbiology, Bibliographies), Toxins + antitoxins, Vaccines, Brucella, Bacillus anthracis, Clostridium, Pasteurella, Staphylococcus, Mycobacterium tuberculosis, Viruses, Diseases, Cardiac glycosides, Herbicides, Respiratory diseases, Pharmacology, Penicillins, Psychotropic agents, Antibiotics, Dosage, Central nervous system, Physiology, Pathology, Biochemistry, Biological stains, Immunity, Chemical warfare agents, Biological warfare agents, USSR.

AD-618 472 Div. 16/10
CFSTI Prices: HC$3.00 MF$0.75

Melpar, Inc., Falls Church, Va.
EFFECTS OF R-F ENERGY ON BIOLOGICAL MACROMOLECULES II.
Final rept. for 1 Jul 64-30 Jun 65.
30 Jun 65, 79p
Contract DA18 035AMC292A
Unclassified report

Descriptors: (*Radiation effects, Radiofrequency), (*Enzymes, Radiation effects), (*Cells(Biology), Radiation effects), Chymotrypsin, Glycoside hydrolases, Inhibition, Frequency, Time, Temperature, Voltage, Morphology(Biology).

Radio frequency inactivation of the enzymes chymotrypsin and alpha-amylase and living cells of the Mouse L-929 line were studied with variables of frequency, time, temperature, voltage, and pulse duty cycle. Inactivation times of the order of 1 minute were found for the living cells, and cell death was morphologically different from that caused by heat inactivation. Although in some experiments enzyme inactivation of up to 30% was observed on

irradiation for times of the order of 10 hours, statistical analysis of the data did not indicate close correlation of enzyme inactivation with any of the variables tested. (Author)

AD-618 489 Div. 16/11, 30/3
CFSTI Prices: HC$1.00 MF$0.50

IIT Research Inst., Chicago, Ill.
DEVELOPMENT OF AN ORALLY EFFECTIVE INSECT REPELLENT.
Quarterly progress rept. for 1 May-30 Jul 65,
by Philip Kashin. 30 Jul 65, 25p
Rept. no. IITRI-L6021-3
Contract DA49 193MD2281, Proj. L6021
Unclassified report

Descriptors: (*Insect repellants, Effectiveness), (*Culicidae, Insect repellants), (*Bites + stings, Electronic recording systems), Mouth, Selection, Aedes, Immunology, Amides, Aromatic compounds, Synthesis(Chemistry), Mice, Skin.

Further studies were carried out on the electronic recording method for the detection of mosquito biting activity described in AD-614 970, and new applications for this apparatus were conceived and tested. New experimental approaches to the development of a systemically effective insect repellent were also conceived, and preliminary tests of the feasibility of these approaches were begun by utilizing the electronic method. A rescreening program of some known mosquito repellents with the electronic apparatus was also initiated.

AD-618 504 Div. 16/1, 16/3
CFSTI Prices: HC$1.00 MF$0.50

Washington, Univ., Seattle.
PHYSIOLOGICAL AND ENVIRONMENTAL INFLUENCES ON THE METABOLISM OF THYROID HORMONES.
Annual progress rept. for 1 Jul 64-30 Jun 65,
by J. Thomas Dowling, C. J. Goodner, and R. E. Cutler.
30 Jun 65, 15p
Contract DA49 193MD2420
Unclassified report

Descriptors: (*Thyroid hormones, Metabolism), (*Metabolism, Thyroid hormones), Endocrine glands, Diseases, Metabolic diseases, Thyroxine, Life cycle, Morphology(Biology), Amphibians, Liver, Toxicity, Pituitary gland, Insulin, Testosterone, Iodine, Pregnancy, Physiology, Pathology, Rats, Humans, Abstracting, Tables.

The object of the research was (1) to determine the effects of disease, physiological alternations and environmental conditions on the peripheral metabolism of thyroid hormones; and (2) to determine the effects of thyroid hormones on the intermediate metabolism of energy-providing substrates and on other neural and endocrine homeostatic mechanisms which are activated in certain disease states and during manipulations of the environment. Background: During the past year the following topics were completed or extended: (1) a second part of the studies of comparative physiology of thyroid hormone metabolism: alternations in thyroxine metabolism during metamorphosis and molting in amphibia; (2) additional studies of the hepatic incorporation of thyroxine in Graves' disease, nodular toxic goiter, myxedema and in hepatic disease; (3) the effects of thyrotoxicity on the renal concentrating mechanism in man and in rats; and (4) further studies of anterior pituitary metabolism. Other work has been directed toward developing techniques for study of insulin antagonism, toward indirectly assessing the potency and duration of action of anabolic congeners of testosterone, and studies of iodine metabolism during human pregnancy.

AD-618 505 Div. 16/1, 16/3
CFSTI Prices: HC$1.00 MF$0.50

Washington Univ., Seattle.
THYROXINE METABOLISM BY AMPHIBIAN SKIN DURING METAMORPHOSIS AND MOLTING,
by J. Thomas Dowling. 1964, 18p
Contract DA49 193MD2420; Grant AM05825
Unclassified report

Descriptors: (*Metabolism, Amphibians), (*Thyroxine, Metabolism), (*Amphibians, Skin), Thyroid hormones, Life cycle, Morphology(Biology), Enzymes, Metabolic diseases, Tissues(Biology), Tables.

Both intact segments and crude homogenates of frog and toad skin rapidly form tetraiodothyroacetic acid from thyroxine. Substrate and product addition inhibits the activity in frog skin, but the system in toad skin is not appreciably inhibited by concentrations of thyroxine or of tetraiodothyroacetic acid up to 2600 ug per cent. Most, if not all, of the activity is localized in the epidermis. Although heat-labile deiodination of thyroxine is undetectable in toad skin and dissociated from oxidative deamination in frog skin, tetraiodothyroacetic acid is partially deiodinated in intact animals. During metamorphosis, heat-labile deiodinating activity markedly decreases in amphibian liver whereas a phase of increased activity occurs in the skin and tail during the formation of hind leg buds. Tetraiodothyroacetic acid does not appear until metamorphosis is complete. Finally, both regional differences and differences during various days of the molting cycle are observed in deiodination and oxidative deamination by frog skin. (Author)

AD-618 506 Div. 16/1, 16/3
CFSTI Prices: HC$2.00 MF$0.50

Washington Univ., Seattle.
THE EFFECTS OF INSULIN UPON GLUCOSE METABOLISM AND PROTEIN SYNTHESIS BY THE ANTERIOR PITUITARY IN VITRO,
by Charles J. Goodner. 1964, 28p
Contract AD49 193MD2420; Grant AM07803
Unclassified report

Descriptors: (*Insulin, Physiology), (*Glucose, Metabolism), (*Proteins, Biosynthesis), (*Pituitary gland, Metabolism), Stimulation, Oxidation, Lipids, Buffers, Phosphates, Labeled substances, Amino acids, Rats.

The effects of insulin upon the metabolism of glucose by single rat anterior pituitary glands in vitro were compared with the effects of raising the concentration of glucose in the suspending medium. The pattern of stimulation with insulin differed from that induced by increasing glucose. Insulin enhanced glucose oxidation, glycogenesis and lipogenesis out of proportion to the increase in glucose uptake. The anterior pituitary exhibited relative insensitivity to insulin in vitro compared to muscle and adipose tissue. The incorporation of glycine C14 into tissue protein was stimulated by insulin and this effect was undiminished in the absence of glucose in the medium. The incorporation of C14-alpha-amino-isobutyric acid from the medium into the anterior pituitary was greater than that reported for rat diaphragm and was not affected by insulin. The data indicate that insulin could potentially affect hormonogenesis in anterior pituitary through stimulation of protein synthesis. (Author)

AD-618 507 Div. 16/1, 16/3
CFSTI Prices: HC$1.00 MF$0.50

Washington Univ., Seattle.
ASSAY OF INSULIN ANTAGONISM BY SERIAL INCUBATION OF PAIRED RAT HEMIDIAPHRAGMS,
by Mayer B. Davidson and Charles J. Goodner.
1965, 20p
Contract DA49 193MD2420; Grant AM07803 02
Unclassified report

Descriptors: (*Insulin, Biological assay), (*Diaphragms(Anatomy), Insulin), Glucose, Albumins, Fatty acids, Diabetes, Rats.

A method utilizing serial incubations of paired rat hemidiaphragms was developed. In this technique, two basal glucose uptakes and two uptakes in the presence of insulin can be determined in a single rat, thus eliminating rat to rat variations when comparing two insulin effects. This system, particularly useful for the study of insulin antagonism, was applied to the assay of the albumin-associated antagonist in various human and commerical preparations. The presence of higher concentrations of this antagonist in untreated adult-onset diabetics was confirmed. Varying amounts of antagonism were found in the commercial albumins preparations. Evidence is presented suggesting that total bound free fatty acids do not play an important role in the albumin-associated insulin antagonism. (Author)

AD-618 508 Div. 16/1, 16/3
CFSTI Prices: HC$1.00 MF$0.50

Washington Univ., Seattle.
STUDIES ON THE MECHANISM OF INSULIN ANTAGONISM BY ALBUMIN IN RAT DIAPHRAGM,
by Mayer B. Davidson and Charles J. Goodner.
1964, 18p
Contract DA49 193MD2420, Grant PHS AM07803 02
Unclassified report

Descriptors: (*Insulin, Physiology), (*Diaphragms-(Anatomy), Insulin), (*Albumins, Physiology), Glucose, Inhibition, Amino acids, Labeled substances, Muscle proteins, Glycogen, Biosynthesis, Cells(Biology).

Utilizing a modification of the rat diaphragm technique, studies of the mechanism of action of the albumin-associated antagonist were carried out using human fraction V. It was demonstrated that the antagonist could not be washed off of the diaphragm, that prior exposure of the diaphragm to insulin did not fully protect it from subsequent antagonism of the insulin effect and that although antagonism was proportional to albumin concentration, large excesses of insulin could not completely overcome small concentrations of the antagonist. The intracellular accumulation of AIB was inhibited by the antagonistic albumin but not by a non-antagonistic one (bovine fraction V). Both albumins depressed radioactive glycine incorporation into muscle protein. The antagonist was shown to inhibit glucose uptake much more than glycogen synthesis. These data indicate that the albumin-associated antagonist primarily blocks insulin effects on transport by either an extremely strong binding to the muscle cell or an irreversible alteration of the disphragm's response to insulin without binding. (Author)

AD-618 509 Div. 16/1, 16/3

Washington Univ., Seattle.
IODINE METABOLISM DURING HUMAN PREGNANCY IN AN AREA OF IODINE ABUNDANCE,
by J. Thomas Dowling, William G. Appleton, and John T. Nicoloff. 1964, 29p
Contract DA29 193MD2420; Grant PHS AM0825
Unclassified report

Available only for reference use at DDC Field services. Copy is not available for public sale.

Descriptors: (*Pregnancy, Iodine), (*Iodine, Metabolism), Thyroxine, Excretion, Urine, Blood plasma, Embryos, Sodium compounds, Thiocyanates.

A significant proportion of I132 as iodide leaves the circulation of pregnant women into a compartment other than thyroid or urine, presumably the conceptus. The compartment is obliterated by sodium thiocyanate, indicating an active transport mechanism. Thyroid and renal clearances of I132 are increased, the former to a proportionately greater degree than the latter, late in pregnancy. The net daily turnover of thyroxine iodine expressed in terms of body surface area is not increased by pregnancy. In the geographic area of the study, urinary iodine excretion and plasma iodide concentrations are higher, while thyroid iodide clearances are lower than in many locales. The data imply that a relative deficiency of iodide induced by hemodynamic changes and by the growing conceptus and its turnover of organic iodide contribute to the apparent hyperfunction of the thyroid during normal human pregnancy. (Author)

AD-618 510 Div. 16/1, 16/3, 16/10
CFSTI Prices: HC$1.00 MF$0.50

Washington Univ., Seattle.
STUDIES OF THE RENAL CONCENTRATING MECHANISM IN HUMANS. I. THE EFFECT OF HYPERTHYROIDISM,
by R. E. Cutler, H. Glatte, and J. T. Dowling.
1964, 13p
Contract DA49 193MD2420; Grant PHS AM08593
Unclassified report

Descriptors: (*Thyroid gland, Diseases), (*Urinary system, Thyroxine), (*Thyroxine, Urinary system), Thyroid hormones, Toxicity, Pituitary hormones, Urine, Urea, Excretion, Kidneys, Diuretics, Blood volume.

Summary: (1) The maximum urinary osmolality after dehydration and exogenous vasopressin was significantly decreased during thyrotoxicosis in patients and during the administration of l-triiodothyronine to normal subjects when compared to their eumetabolic state. Although Umax was decreased during thyrotoxicosis, TcH2O during a moderate mannitol diuresis was unchanged in most patients. The data suggest that the decreased Umax and normal TcH2O in thyrotoxic individuals is probably caused by an increase in medullary blood flow with a decrease in medullary osmolality. (2) Renal hemodynamics were universally increased during induced thyrotoxicosis in normals but were not significantly changed in patients with thyrotoxicosis. (3) Urea clearance during mannitol diuresis paralleled the changes in GFR in both groups. It is possible that the decrease in plasma urea noted in thyrotoxic patients is due to decreased hepatic synthesis. (Author)

AD-618 513 Div. 16/3
CFSTI Prices: HC$1.00 MF$0.50

Louisville Univ., Ky. School of Medicine.
STEROID-PROTEIN INTERACTIONS.
Progress rept. for 16 Nov 63-31 May 65,
by Ulrich F. Westphal. 31 May 65, 17p
Contract DA49 193MD2263
Unclassified report

See also AD-423 987.

Descriptors: (*Steroids, Proteins), (*Proteins, Steroids), (*Progesterone, Molecular association), (*Glycoproteins, Molecular association), Impurities, Iron, Globulins, Purification, Chromatographic analysis, Adsorption, Blood serum, Separation, Corticosteroid agents, Osmosis, Albumins, Alcohols.

Studies on the binding of progesterone to alpha-1-acid glycoprotein were continued. A decreasing effect of traces of heavy metals, especially Fe(++), on the binding affinity was observed. Complete deionization of the test system is necessary. Purification of human corticosteroid-binding biobulin (CBG) by DEAE cellulose chromatography and hydroxylapatite adsorption procedures resulted in an overall concentration of about 700-fold. Application of similar chromatographic techniques, including sephadex G-200 fractionation, to rabbit serum yielded preparations that were purified approximately 2000-fold. Sera of man, monkey, rat, rabbit and guinea pig were freed of endogenous corticosteroids by sephadex filtration at 45C. The binding affinities of these sera were then determined by multiple equilibrium dialysis at five concentrations each of cortisol, corticosterone and progesterone, at 4C and 37C. Concentrations of corticosteroid-binding sites and their association constants were determined. (Author)

AD-618 533 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

New Hampshire Univ., Durham.
THE USE OF ALASKAN GROUND SQUIRREL CELL CULTURES FOR VIRUS PROPAGATION,
by T. G. Metcalf. Dec 64, 16p
Contract AF41 609 1856, Proj. 8241, Task 824101
AAL TDR-64-11
Unclassified report

Descriptors: (*Tissue culture cells, Rodents), (*Virus diseases, Hibernation), (*Rodents, Tissue culture cells), Fats, Kidneys, Enteroviruses, Coxsackie virus, ECHO virus, Poliomyelitis virus, Diagnosis, Culture media, Monkeys.

Brown fat and kidney tissues from the Alaskan ground squirrel were cultured successfully in vitro. The use of primary explant cultures of ground-squirrel kidney for virus cultivation revealed its suitability for the propagation of selected enteric and respiratory viruses. A possible extension of the findings of the study to problems of diagnostic virology is indicated. (Author)

AD-618 542 Div. 16/5
CFSTI Prices: HC$2.00 MF$0.50

Ohio State Univ., Columbus.
CEPHALOMETRIC AND CLINICAL COMPARISONS OF TISSUE CONDITIONING PROCEDURES IN EDENTULOUS MAXILLARY ARCHES.
Master's thesis,
by Robert Charles Johns. 1965, 43p
Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.

Descriptors: (*Teeth, Prosthetics), (*Dentistry, Prosthetics), (*Tissues(Biology), Mouth), Diagnosis, Pathology, Medical examination, Membranes(Biology), Mucus, Radiography.

The purpose of this study was to determine the differences in the recovery responses of irritated tissues beneath ill-fitting dentures in the maxillary arch, using two different procedures. These procedures are: (1) the use of tissue conditioning materials to aid the tissues in their recover, and (2) the complete removal of the ill-fitting dentures for 72-hour periods before new impressions are made. Clinical evaluations, diagnostic casts, and cephalometric tracings were used to make the comparisons of the two procedures.

AD-618 543 Div. 16/5
CFSTI Prices: HC$2.00 MF$0.50

Marquette Univ., Milwaukee, Wis.
THE PAN-O-REX RADIOGRAPH EMPLOYED AS AN ADJUNCT IN DETERMINING ANY MEASURABLE DESCENT OF THE MANDIBULAR CONDYLE HEADS UTILIZING PIVOTS.
Masters' thesis,
by Benjamin E. Dooley. May 65, 31p
Unclassified report

Descriptors: (*Dentistry, Radiography), (*Teeth, Prosthetics), Bone, Joints(Physiology), Head, Mouth, Muscles, Pathology, Measurement.

The report is concerned with the task of trying to detect condyle descent using pivots. The Pan-O-Rex Radiographic Machine was used for a static study of the mandibular joint while employing the Sear's pivot. The results of the investigation were dependent on accurate analysis of the radiographs taken with the Pan-O-Rex Machine.

AD-618 553 Div. 16/11, 16/10

Ohio State Univ., Columbus.
THE EFFECT OF CYCLOPHOSPHAMIDE (CYTOXAN) ON THE BLADDER MUCOSA.
Master's thesis,
by Robert Francis Nikolewski. 1965, 167p
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Urinary system, Pathology), (*Nitrogen mustards, Urinary system), Neoplasms, Cancer, Chemotherapy, Chemotherapeutic agents, Membranes(Biology), Mucus, Cytology, Toxicity, Diseases, Reticulo-endothelial system, Cytoplasm, Mitochondria, Morphology(Biology), Dosage, Urine.

Cyclophosphamide is a nitrogen mustard which is linked by way of the nitrogen atom to a phosphoric-acid-esteramide that allows for its relative inactivity in vitro. Through enzymatic activity in vivo there is a transformation of the inert cyclophosphamide to active cytotoxic derivative(s) which causes cytologic alteration and cell death to normal and tumor tissues. Its value as an antitumor agent has been in the treatment of patients with malignancies arising from hematopoietic tissues, malignant lymphomas, leukemias and carcinomas arising from the breast and ovary. One of the side effects reported following cyclophosphamide chemotherapy was the occasional manifestation of a sterile, hemorrhagic cystitis. Injections of cyclophosphamide into white male Wistar rats illicits a severe hemorrhagic cystitis. Electron microscopic examination of rat bladder transitional epithelial over various periods of time following injection, illustrated cytoplasmic degeneration, cellular exfoliation and cell death, nuclear dysplasia and subsequent epithelial regeneration.

AD-618 558 Div. 16/1

Medical Coll. of South Carolina, Charleston.
THE EFFECT OF SOME ACUTELY INDUCED ACID-BASE ALTERATIONS ON CAROTID BODY CHEMORECEPTOR SENSITIVITY TO CO2.

Master's thesis,
by Hugh F. Mulligan, II. May 65, 57p
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Carbon dioxide, Sensitivity), (*Chemoreceptors, Carbon dioxide), Nerves, Buffers(Chemistry), Acid-base reactions, Cyanides, Stimulation.

Carotid chemoreceptor activity has been monitored in the most direct way possible, that of recording nerve action potentials from Hering's nerve. The responses of these chemoreceptors to CO2 as a stimulus has been compared under normal conditions and under conditions chosen for reducing the intracellular buffering capacity of these specialized cells. Early results indicate that, following partial buffer depletion of the chemoreceptor cells, their responses to any given CO2 value were greater than those observed prior to buffer depletion. The absence of a clear-cut indication of increased sensitivity to changes in pCO2 was discussed in relation to the 'intracellular acidity' theory. (Author)

AD-618 565 Div. 16/2, 16/4, 16/6
CFSTI Prices: HC$3.00 MF$0.75

Institute of Contemporary Russian Studies, Fordham Univ., New York.
SELECTED ABSTRACTS FROM SOVIET BIOMEDICAL JOURNALS, SERIES 3, NO. 2,
by Robert Pollitzer. Feb 65, 94p
Contract DA18 108 405CML867A
TT 65-62679
Unclassified report

See also AD-433 198.

Descriptors: (*Medicine, Periodicals), (*Microbiology, Abstracting), Bibliographies, Pest control, Communicable diseases, Immunology, Virus diseases, Epidemiology, USSR.

AD-618 573 Div. 16/1
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Berkeley.
EFFECTS OF HIGH ALTITUDE ON PULMONARY AND SYSTEMIC BLOOD PRESSURES IN UNANESTHETIZED MONKEYS,
Master's thesis,
by Walter Herndon Inge, Jr. 1965, 82p
Grants NsG170, NsG513
Unclassified report

Descriptors: (*Blood pressure, High altitude), (*High altitude, Blood pressure), Blood vessels, Veins, Arteries, Aorta, Hypoxia, Lungs, Heart, Hematology, Metabolism, Barometric pressure, Surgical techniques, Electronic recording systems, Tables, Monkeys.

Aortic, pulmonary and left atrial blood pressures were recorded by means of chronically implanted catheters in two pig-tailed monkeys (Macaca nemistrina) for periods of approximately two weeks at sea-level (pre-altitude), four weeks at an altitude of 3,800 meters (altitude), then two more weeks upon return to sea-level (post-altitude). Aortic and venous pressures were recorded in three additional monkeys at sea-level only. After one week at altitude aortic pressures had approached 125 per cent of the pre-altitude average. The aortic pressure then declined steadily throughout the altitude stay, reaching pre-altitude values during the last week at altitude. In the post-altitude phase aortic pressure dropped below pre-altitude values, reaching a low of 60 to 70 per cent of per-altitude averages, then gradually approaching 100 per cent. Mean pulmonary blood pressures were elevated throughout the altitude stay, with a range of from 142 per cent to 260 per cent of pre-altitude averages. Pulmonary arterial pressures dropped upon return to sea-level, but remained above pre-altitude averages in a range of 100 to 210 per cent. Changes in left atrial pressures were inconclusive. Results of the present study are compared with those of previous high altitude studies on various experimental animals or on humans. It was concluded that the response to altitude of the subhuman primate preparation used in the present study closely parallels that of man, and that therefore such a preparation is to be preferred over other species commonly employed in such studies.

AD-618 574 Div. 16/3, 16/1

Minnesota Univ., Minneapolis. Dept. of Ophthalmology.
SUBSTRATE INHIBITION OF TETRAZOLIUM SALT REDUCTION IN DARK ADAPTED RETINAE,
by W. L. Fowlks and David E. Peterson.
2 Sep 64, 5p
Contract DA49 193MD3457; Grant NIH B1979
Unclassified report

Pub. in Proceedings of the Society for Experimental Biology and Medicine v118 p491-4 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Retina, Biochemistry), (*Biological stains, Reduction(Chemistry)), N-heterocyclic compounds, Chlorides, Glutamic acid, Succinates, Inhibition, Rabbits.

The inhibitory effects of glutamate and succinate on the reduction of nitroblue tetrazolium chloride by dark-adapted rabbit retinae are reported and discussed.

AD-618 578 Div. 16/1

Walter Reed Army Inst. of Research, Washington, D. C.
ORIGIN OF PULMONARY MEGAKARYOCYTES,
by Richard M. Kaufman, Romano Airo, Simeon Pollack, William H. Crosby, and Raymond Doberneck. 3 Jul 64, 9p
Unclassified report

Pub. in Blood v25 n5 p767-75 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Blood platelets, Lungs), (*Lungs, Blood platelets), Hematology, Blood cells, Surgery, Stimulation, Dogs.

Evidence is presented which indicates that pulmonary megakaryocytes do not originate in the lungs but elsewhere in the body and are carried to the lungs in the venous blood. Some megakaryocytes in the lungs evidently deliver platelets to the blood. Surgery is a potent stimulus to megakaryocyte production; the numbers of megakaryocytes found in the lung postoperatively is significantly increased. (Author)

AD-618 579 Div. 16/10, 16/1

Walter Reed Army Inst. of Research, Washington, D. C.
EXCRETION OF ALDOSTERONE IN INAPPROPRIATE SECRETION OF ANTIDIURETIC HORMONE FOLLOWING HEAD TRAUMA,
by James P. Knochel, James R. Osborn, and Everett B. Cooper. 4 Jan 64, 11p
Unclassified report

Pub. in Metabolism v14 n6 p715-25 Jun 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Head, Wounds + injuries), (*Corticosteroid agents, Excretion), (*Pituitary hormones, Secretion), Body fluids, Blood serium, Urine, Electrolytes(Physiology), Sodium, Potassium, Saliva, Shock(Pathology), Metabolism.

A patient is reported with the typical syndrome of inappropriate secretion of ADH (vasopressin), who retains water with waterloading, expands his extracellular space, dilutes his serum sodium, and further, loses sodium in his urine. These observations agree with investigative studies reported elsewhere which show that the normal subject who receives vasopressin does the same. Excessive loss of sodium in this patient's urine is explained by decreased aldosterone excretion which was confirmed by measurement and appropriate changes in sodium:potassium ratio in urine and saliva. After several days, despite a persistently expanded extracellular space and hyponatremia, aldosterone excretion became excessive for 6 days. This observation may well represent the mechanism by which the normal subject given vasopressin for a prolonged period becomes refractory to the hormone and conserves sodium despite expansion of body water compartments. Late rise in aldosterone excretion occurs by an undetermined mechanism which does not fit current theories regarding control mechanisms for aldosterone secretion. (Author)

AD-618 581 Div. 16/13, 22/4, 32/6

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
BALLISTIC AND FORENSIC PATHOLOGIC ASPECTS OF MISSILE WOUNDS. CONVERSION BETWEEN ANGLO-AMERICAN AND METRIC-SYSTEM UNITS,
by Pierre A. Finck. 1965, 25p
Proj. 5010780000

Unclassified report

Pub. in Military Medicine v130 n6 p545-69 Jun 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Wounds + injuries, Ballistics), (*Bullet wounds, Ballistics), (*Projectiles, Wounds + injuries), (*Law, Wounds + injuries), Reports, Standardization, Measurement, Tables, Pathology, Battle wounds, Accidents, Criminology.

The purpose of the paper is to provide means of interpreting and converting some of the various factors involved in the kinetic energy of projectiles. It is intended for those who deal with missile wounds: investigators, lawyers, and physicians, particularly pathologists and surgeons. The word 'missile' or 'projectile' as used here implies bullets, pellets from shotguns, and fragments from devices such as grenades and explosive shells. Conversion tables between Anglo-American and metric-system units are provided for the convenience of those, particularly the members of the Armed Forces, who have to evaluate data coming from other countries and who do not always have numerous bulky reference books at their disposal. (Author)

AD-618 582 Div. 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
OCULAR LESIONS OF JUVENILE XANTHOGRANULOMA (NEVOXANTHOENDOTHELIOMA),
by Lorenz E. Zimmerman. 1965, 30p
Grant PHS NB5379

Unclassified report

Presented at the Annual Session of the American Academy of Ophthalmology and Otolaryngology (69th), Chicago, 18-23 Oct 1964
Pub. in Transactions of American Academy of Ophthamology and Otolaryngology p412-39 May-Jun 1965 (Copies not available to DDC or Clearinghouse customers)
Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.

Descriptors: (*Neoplasms, Eye), (*Eye, Neoplasms), Skin, Diseases, Etiology, Histology, Children.

Juvenile xanthogranuloma (JXG), a disease of unknown etiology and pathogenesis but recognized by dermatologists for over half a century, has attracted the attention of ophthalmologists only during the past decade. It is typically a benign dermatologic condition of infants and young children, and the several ocular complications provide the only important exception to its otherwise excellent prognosis. JXG has a noteworthy tendency to affect the iris, producing hemorrhages into the anterior chamber, a secondary glaucoma, and blindness. Other ocular manifestations include the formation of epibulbar lesions, corneal involvement, nodules on the lids, and proptosis due to orbital granulomas. A comparative study of the ocular and orbital lesions of JXG and those of the 'histiocytosis X' group of diseases lends additional support to the belief that JXG is not related to Hand-Schuller-Christian disease, Letterer-Siwe disease, and eosinophilic granuloma of bone. (Author)

AD-618 590 Div. 16/15, 28/3

Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
COLOR-MIXTURE FUNCTIONS AT LOW LUMINANCE LEVELS.
Interim rept.,
by Whitman Richards and S. M. Luria. 7 Jan 64, 36p
Rept. no. 439; Vol. 23/No. 21
Proj. MR005 14, Task MR005 14 1001
NAVMED MR005.14-1001-1.38

Unclassified report

Pub. in Vision Research v4 p281-313 1964 (Copies available only to DDC users).

Descriptors: (*Color vision, Illumination), (*Visual perception, Colors), Visual acuity, Tables, Performance-(Human), Brightness, Luminescence, Retina.

Color-mixture and luminosity functions for a 2-degree test field with a 10-degree surround were obtained from three observers at three luminance levels in the mesopic region using both foveal and 3 degrees 20' parafoveal fixations. For the fovea, the luminosity functions remained constant as the luminance was decreased, but there were large changes in the color-mixture functions. In spite of these changes, however, photometric additivity expressed in the form of Abney's Law appears to be approximately valid at all luminance levels. In the parafovea, both the color-mixture and luminosity functions changed with luminance, and the changes in the color-mixture functions were almost identical with those occurring in the fovea. All the results are shown to be in accord with the hypothesis that, as luminance is reduced, there is an increasing concentration of rhodopsin which is localized primarily in one type of receptor whose response function is also partially responsible for the photopic color sensitivity at short wavelengths. It appears, therefore, that one type of receptor is active at all luminance levels and undergoes a change from a photopic to a scotopic function in the mesopic region as a result of a conversion from a photopic 'blue' pigment to rhodopsin. (Author)

AD-618 591 Div. 16/1

Naval Submarine Medical Center, Groton, Conn. Medical Research Lab.
ENVIRONMENTAL PHYSIOLOGY OF SUBMARINES

AND SPACECRAFT.
Interim rept. no. 2,
by Karl E. Schaefer. 29 Oct 64, 14p
Rept. no. 440; Vol. 23/No. 22
Proj. MR005 14, Task MR005 14 3002
NAVMED MR005.14-3002-1.14
Unclassified report

Pub. in Archives of Environmental Health v9 p320-31 Sep 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Closed ecological systems, Stress-(Physiology)), (*Carbon dioxide, Toxic tolerances), Toxicity, Spacecraft cabins, Submarines, Exposure, Acclimatization, Physiology, Space medicine, Atmosphere, Hazards, Oxygen, Aerosols, Biochemistry.

Attention is drawn to the fact that there is a lack of knowledge in three important areas pertaining to adaptation to the atmosphere in closed environments. The difficulties involved in developing criteria to establish threshold limit values for continuous exposure are demonstrated in the results of chronic CO2 toxicity studies, wherein subjects exposed to 1.5% for 42 days showed no change in basic physiological functions and standard performance, but did show marked changes in body chemistry -- extremely long acclimatization and deacclimatization periods, lasting 23 and 28 days respectively. (Author)

AD-618 592 Div. 16/15, 28/3

Naval Submarine Medical Center, Groton, Conn.
Medical Research Lab.
DIFFERENTIAL COLOR SENSITIVITY IN THE PURPLE REGION.
Interim rept.,
by Mary M. Connors and Michael H. Siegel.
6 Jun 64, 6p Rept. no. 445; Vol. 24/No. 1
Proj. MR005 14, Task MR005 14 1001
NAVMED MR005.14-1001-1.39
Unclassified report

Pub. in Journal of the Optical Society of America v54 n11 p1374-7 Nov 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Color vision, Visual acuity), (*Retina, Sensitivity), (*Visual perception, Colors), Spectroscopy, Illumination, Analysis of variance.

Color discrimination was measured by the method of constant stimuli at eight points along a blue to red continuum. The standard deviations of judgments of color difference were used as the measure of discrimination. In terms of ratios of luminances of the components, the sensitivity throughout most of the purple region is relatively constant. There is some decrease in sensitivity at the blue extreme and a larger decrease at the red end. The results are plotted on a CIE x, y chromaticity diagram and compared with similar data of other authors. (Author)

AD-618 593 Div. 16/1, 16/10

Naval Submarine Medical Center, Groton, Conn.
Medical Research Lab.
TIME COURSE OF CHANGES IN SURFACE TENSION AND MORPHOLOGY OF ALVEOLAR EPITHELIAL CELLS IN CO2-INDUCED HYALINE MEMBRANE DISEASE.
Interim rept.,
by K. E. Schaefer, M. E. Avery, and K. Bensch.
2 Mar 64, 16p Rept. no. 446; Vol. 24/No. 2
Proj. MR005 14, Task MR005 14 3002
NAVMED MR005.14-3002-1.13 Unclassified report

Pub. in Journal of Clinical Investigation v43 n11 p2080-92 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Lungs, Cells(Biology)), (*Membranes-(Biology), Diseases), (*Carbon dioxide, Toxicity), Histology, Morphology(Biology), Surface tension, Cell structure, Surface-active substances, Secretion.

Atelectasis and hyaline membranes produced by exposure of guinea pigs to 15% CO2 were found to be associated with disappearance of lamellar bodies in the large alveolar lining cells (granular pneumocytes) and an associated decrease in surfactant as indicated in the rise of minimal surface tension of the lungs. This process is limited to the uncompensated phase of respiratory acidosis and is reversed during the compensatory phase. The parallel time course in changes of surface tension and alterations of lamellar bodies in the granular pneumocytes provides additional evidence for the identification of the latter as the cells responsible for the secretion of surfactant. (Author)

AD-618 594 Div. 16/15, 28/3

Naval Submarine Medical Center, Groton, Conn.
Medical Research Lab.
RELATIVE YELLOW-BLUE SENSITIVITY AS A FUNCTION OF RETINAL POSITION AND LUMINANCE LEVEL.
Interim rept.,
by Seymour Weissman and Jo Ann S. Kinney.
25 Aug 64, 6p Rept. no. 447; Vol. 24/No. 3
Proj. MR005 14, Task MR005 14 1001
NAVMED MR005.14-1001-1.40
Unclassified report

Pub. in Journal of the Optical Society of America v55 n1 p74-7 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Color vision, Illumination), (*Visual perception, Colors), (*Retina, Sensitivity), Colors, Luminescence, Stimulation, Determination, Visual acuity.

Relative sensitivity for yellow and blue was determined by hue cancellation, using the method of constant stimuli. Measurements were made with a 1-degree stimulus at the fovea, 2 degrees above the fovea, and every 4 degrees along the upper vertical meridian out to 18 degrees at three luminance levels (0.5, 0.1, and 0.01 ft-L). Relative yellow-blue sensitivity remained much the same from fovea to periphery for the two highest light levels. At the lowest luminance level there was a slight increase in relative blue sensitivity in the near periphery and a progressive decrease in relative yellow sensitivity as the peripheral angle increased. The variability of color discrimination increased greatly as luminance decreased and the peripheral angle increased. (Author)

AD-618 595 Div. 16/3, 16/1

Naval Submarine Medical Center, Groton, Conn.
Medical Research Lab.
CARBONIC ANHYDRASE ISOZYMES OF NEONATAL AND ADULT HUMAN AND SOME ANIMAL ERYTHROCYTES.
Interim rept.,
by Donald V. Tappan, Michael J. Jacey, and Helen M. Boyden. 8 Apr 65, 13p
Rept. no. 448; Vol. 24/No. 4
Proj. MR005 14, Task MR005 14 3002
NAVMED MR005.14-3002-10.01 Unclassified report

Pub. in Annals of New York Academy of Sciences v121 p589-99 1965 (Copies not available to DDC or clearinghouse customers).

Descriptors: (*Erythrocytes, Enzymes), (*Enzymes, Erythrocytes), (*Carbonic anhydrase, Purification), Chromatographic analysis, Electrophoresis, Carboxylic ester hydrolases, Proteins, Controlled atmospheres, Carbon dioxide.

Ion exchange separations utilizing DEAE-cellulose are described that are capable of isolating carbonic anhydrases individualily or in groups as they occur in bovine, guinea pig, adult human, or neonatal human erythrocytes. Acrylamide gel electrophoresis procedures have been utilized for evaluation of purification processes as well as for demonstration of relative carbonic anhydrase activities of the various enzymes and for estimation of their esterase activities. Guinea pig carbonic anhydrases, similar to those from human erythrocytes, have both high and low specific activity forms, while the bovine enzymes demonstrate no such difference in activity. The pattern of the neonatal resembles that of the major adult human carbonic anhydrases; a reduction in activity, however, is apparent for the principal high activity form of the enzyme. The total recoverable enzyme as well as the measurable activity is lower in neonatal than adult erythrocytes. The active carbonic anhydrases in the three species studied have esterase activities independent of carbonic anhydrase activity but approximately proportional to protein concentration. (Author)

AD-618 600 Div. 16/1, 16/10

New Yrok State Univ., Buffalo. School of Medicine.
NEUROLOGIC HAZARDS OF HYPERBARIC OXYGEN EXPOSURE,
by H. W. Gillen. 1964, 6p
Contracts Nonr434300, Nonr96904
Unclassified report

Pub. in Diseases of the Chest v47 n4 p369-73 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Oxygen, Poisoning), (*Nervous system, Poisoning), Respiration, Toxicity, Embolism, Decompression sickness, Metabolism, Reviews.

Exposure to hyperbaric oxygen may result in several types of tissue damage. Some of these are irreversible. Acute oxygen poisoning of the nervous system has been well-documented and some of the possible problems presented by the use of hyperbaric oxygenation are discussed. Hyperbaric exposure per se may result in both decompression illness and cerebral air embolism if the decompression technics or schedules are not correct. The neurologic manifestations are described and some of the mechanisms are presented. (Author)

AD-618 601 Div. 16/3, 16/4, 16/4

Indiana Univ., Bloomington. Dept. of Chemistry.
ANTIBODY FORMATION AND THE CODING PROBLEM,
by Felix Haurowitz. 1965, 12p
Contracts Nonr310400, AT11 1 209
Unclassified report

Pub. in Nature v205 n4974 p847-51 Feb 27 1965 (Copies available only to DDC users).

Descriptors: (*Antigens + antibodies, Genetics), (*Genetics, Antigens + antibodies), Proteins, Biosynthesis, Nucleic acids, Ribosomes, Theory.

The purpose of the article is to demonstrate that the template theory of antibody formation is reconcilable with the present views on coding and protein biosynthesis. The finding of the injected antigen in the microsomal fraction of spleen and liver indicates that the antigenic determinants are close to the ribosomal sites of amino-acid incorporation. It is assumed that intermolecular forces between the rigid, polar antigenic determinant and the nascent peptide chain lead to: (1) the rejection of amino-acyl residues which would not allow the peptide chain to fold complementarily over the template; (2) their replacement by amino-acyl residues which enable the peptide chain to form the complementary combining site of the antibody molecule. It is assumed that in this manner the amino-acid sequence dictated by the messenger-RNA is modified in that part of the antibody molecule which combines specifically with the antigenic determinant. Template action of this type may also be involved in the biosynthesis of enzymes, protein hormones or other protein molecules.

AD-618 603 Div. 16/4, 2/5

Arctic Inst. of North America, Washington, D. C.
THE EIDER PASS AT POINT BARROW, ALASKA.
Technical rept.,
by Daniel Q. Thompson and Richard A. Person.
Jan 63, 11p Rept. no. ONR-119(1)
Contract Nonr113801, Proj. NR307 105
Unclassified report

Prepared in cooperation with Cornell Univ., Ithaca, N. Y.
Pub. in Journal of Wildlife Management v27 n3 p348-56 Jul 1963 (Copies not available to DD or Clearinghouse customers).

Descriptors: (*Alaska, Birds), (*Birds, Alaska), (*Ecology, Birds), Alaska, Weight, Aging(Physiology), Sex.

Daily observations were made on king (Somateria spectabilis) and Pacific eiders (Somateria mollissima v. nigra) at the 'Duck Camp,' Point Barrow, Alaska, July 14-September 1, 1953. Mean flock size was 105 birds from a sample of 497 flocks. The flight was segregated as to sex and age. In the period August 8-17, the kind eider sex ratio shifted from a preponderance of males to a preponderance of females. The mean weight of 41 adult king eider males (1,668 grams) differed from the mean weight of 140 adult females (1,567 grams) at a high level of significance. Limited observations on molt phenology indicated a relatively high degree of synchronization of molt pattern within each sex. Molt of body plumage had reached the caudal tract in king eider males by August 14; females were not so far advanced. Peak eider flights tended to occur with favorable winds; however, the birds were not sensitive to wind velocities below 9 miles per hour. An average of 987 eiders per hour was recorded in 46 days of observation in 1953. The average number of hunters per hour was 4.1. In their average performance, these 4.1 hunters fired 11.5 shots, killed 3.5 eiders, and failed to recover 1.5 cripples per hour. Total mortality to southbound adult eiders from Point Barrow hunters was estimated to be 0.5 percent in 1953. (Author)

AD-618 612 Div. 16/11, 16/10

Chicago Univ., Ill. Medical School.
ABSENCE OF STEROID ACNE IN CHILDREN: A CLINICAL STUDY,
by Thomas J. Cook and Allan L. Lorincz. 1963, 4p
Contract DA49 193MD2341; Grant PHS 2A5263C3
Unclassified report

Rept. presented at the Annual Meeting of the American

Medical Association (112th), Atlantic City, N. J., Jun 63. Pub. in Archives of Dermatology v89 p442-5 Mar 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Skin, Diseases), (*Corticosteroid agents, Skin), (*Steroids, Integumentary diseases), Children, Sex, Face.

In this study 133 patients on long-term high doses of corticosteroids were divided into four age groups, and data were presented relating to development of acne, hypertrichosis, and facial oiliness in each of these groups. It was shown that prepubertal children apparently do not develop acneiform lesions or oiliness of facial skin as a result of corticosteroid therapy, but that hypertrichosis often occurs in these patients. It was also shown that there is no significant sexual or racial difference in the development of these steroid complications. It is suggested that the production of hypertrichosis and acneiform lesions by corticosteroids is not dependent on the androgenic activity of the steroids. (Author)

AD-618 613 Div. 16/11, 16/10

Chicago Univ., Ill. Medical School.
EXCRETION OF INTRAVENOUSLY ADMINISTERED RADIOACTIVE HYDROCORTISONE IN SKIN SURFACE LIPIDS,
by Thomas J. Cook and Alan R. Spector. 1964, 2p
Contract DA49 193MD2341; Grant PHS T1AM5263 04
Unclassified report

Rept. presented at the Annual Meeting of The Society for Investigative Dermatology, Inc. (25th), San Francisco, Calif., 21 Jun 64.
Pub. in Journal of Investigative Dermatology v43 n5 p413-4 Nov 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Corticosteroid agents, Skin), (*Skin, Lipids), Radioactive isotopes, Labeled substances, Tracer studies, Excretion, Parenteral infusions.

It was shown that about 1% of the radioactivity from an intravenously administered quantity of 4-C14-hydrocortisone appeared in the skin surface lipid of 4 adult male volunteers in 24 hours. Twenty-four hour recovery of lipids from the total skin surface was much greater when repeated surface defatting collections were made at 6 hour intervals than when made after a single 24 hour period. (Author)

AD-618 614 Div. 16/11

Chicago Univ., Ill. Medical School.
THE EFFECT OF ANTI-ANDROGENS ON THE RESPONSE OF RAT PREPUTIAL GLANDS TO TESTOSTERONE,
by E. Linn Jones and Linda Woodbury. 20 Nov 63, 5p
Contract DA49 193MD2341; Grant PHS 2A5263C2
Unclassified report

Pub. in Journal of Investigative Dermatology v43 n3 p165-70 Sep 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Testosterone, Sex glands), (*Chemotherapy, Testosterone), Cancer, Diseases, Chemotherapeutic agents, Adrenal glands, Pharmacology, Growth, Chemical compounds.

A method for determining the effect of antiandrogenic compounds on a specialized large sebaceous structure, the rat preputial gland, has been described. Two of the five compounds tested, SC-9420 and SC-10363, reduced the growth of the preputial gland in response to testosterone. In screening compounds for anti-androgenic ability, measurement of the suppression of response of sebaceous structures to testosterone as detecting by weighing the preputial glands can be a useful procedure. (Author)

AD-618 622 Div. 16/2

Illinois Univ., Urbana. Coll. of Veterinary Medicine.
PASSIVE TRANSFER OF THE ACTION OF FREUND'S ADJUVANT BY SERUM OF RABBITS INJECTED WITH THE ADJUVANT,
by D. L. Dawe, D. Segre, and W. L. Myers.
17 Feb 65, 2p
Contract Nonr183437, Proj. NR103 509
Unclassified report

Pub. in Science v148 n3675 p1345-7 Jun 4 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Antiserums, Antigen-antibody reactions), (*Antigen-antibody reactions, Antiserums), (*Vaccines, Antigen-antibody reactions), Corynebacterium, Diseases, Immunity, Gamma globulin, Antigens + antibodies, Rabbits.

Serum collected at intervals from rabbits treated with Freund's complete adjuvant was injected together with fluid diphtheria toxoid into recipient rabbits. Control rabbits received toxoid alone or toxoid mixed with serum of untreated donors. There was no antibody response in the controls or in recipients of serum obtained from donors 3 days after adjuvant treatment. Recipients of serum obtained from donors 1 to 9 weeks after adjuvant treatment responded with antibody formation. The magnitude of the response of recipients was correlated with the increase in gamma-globulin concentration in the serums of the corresponding donor rabbits. Passive transfer of adjuvant action indicates that a serum factor, possibly natural antibody, is partially responsible for the immunity-enchancing activity of Freund's adjuvant. (Author)

AD-618 626 Div. 16/3, 16/1

Indiana Univ., Bloomington. Dept. of Chemistry.
METHODS USED IN WORK ON THE STRUCTURE AND FORMATION OF ANTIBODIES,
by Felix Haurowitz. 1964, 5p
Unclassified report

Pub. in Protides of the Biological Fluids p391-5 1964 (Copies available only to DDC users).

Descriptors: (*Antigens + antibodies, Chemical analysis), (*Immunology, Chemical analysis), Molecular structure, Biosynthesis, Proteins, Labeled substances, Separation, Quantitative analysis, Reviews.

A review is given of the quantitative immunochemical methods used by Haurowitz and his coworkers in studies of the processes which accompany immunization, with particular attention to the use of radioactively labeled antigens and antibodies.

AD-618 627 Div. 16/1

Washington Univ., Seattle.
AUTONOMIC MEDIATION OF THE EFFECT OF RAISED ARTERIAL GLUCOSE UPON FREE FATTY ACIDS,
by C. J. Goodner and W. A. Tustison. 29 Jun 64, 4p
Contract DA49 193MD2420; Grant NIH HD00405 02
Unclassified report

Pub. in Science v146 n3645 p770-72 Nov 6 1964 (Copies

not available to DDC or Clearinghouse customers). Prepared in cooperation with King County Hospital, Seattle, Wash. Dept. of Medicine.

Descriptors: (*Blood, Fatty acids), (*Fatty acids, Control), (*Autonomic nervous system, Fatty acids), (*Glucose, Parenteral infusions), Insulin, Blood plasma, Arteries, Diabetes.

The intravenous infusion of 600 milligrams of glucose over 30 minutes caused a 17 percent fall in the concentration of free fatty acids in arterial blood of subjects who had fasted overnight. This response to glucose was abolished in subjects treated previously with ganglionic or adrenergic blocking agents. Small amounts of insulin were secreted in response to these glucose infusions, but in insulin-dependent diabetics incapable of altering plasma insulin to any great extent, the effect of glucose upon free fatty acids could be obtained provided the subjects were primed with long-acting insulin before the infusions were begun. The response of free fatty acids to doses of glucose which elevated the concentration of glucose in arterial blood by only 3 mg percent and the blockade of this response by autonomic and adrenergic blocking agents suggest that centers in the central nervous system exist which are capable of responding to elevations of arterial glucose by inhibiting the sympathetic tone partially responsible for sustaining lipolysis in fasting. (Author)

AD-618 644 Div. 16/4, 12/1

Foreign Technology Div., Wright-Patterson AFB, Ohio.
THE PROBLEMS OF BIOLOGY OF SPACE FLIGHT. THE IDEAS OF TSIOLKOVSKI BECOME REALIZED,
by V. B. Malkin. 24 May 65, 24p
Rept. no. FTD-TT-65-73
TT 65-62708

Unclassified report

Unedited rough draft trans. of Priroda (USSR) v48 n10 p35-44 1959. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is not available for public sale.

Descriptors: (*Space biology, Space flight), (*Space flight, Space biology), Astronauts, Animals, Acceleration tolerance, Gravity, Weightlessness, Pressurized cabins, Life support, Closed ecological systems, Astronautics, USSR.

AD-618 651 Div. 16/11
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
SEARCH FOR EFFECTIVE CHEMICAL VACCINES AGAINST SOME ZOONOSES. COMMUNICATION IV. EXPERIENCES IN OBTAINING CHEMICAL ANTHRAX VACCINES IN SEMI-INDUSTRIAL CONDITIONS (Izyskanie Effektivnykh Khimicheskikh Vaktsin Protiv Nekotorykh Zoonoz. Soobshchenie 4. Opyt Polucheniya Khimicheskoi Sibireyazvennoi Vaktsiny v Poluproizvodstvennykh Usloviyakh).
by N. I. Aleksandrov, N. E. Gefen, V. G. Runova, and Yu. V. Ezepchuk. 1964, 13p Trans-1023
TT 65-62715

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v41 n1 p119-25 Jan 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Vaccines, Industrial production), (*Bacillus anthracis, Diseases), Antigens + antibodies Biosynthesis, Immunology, Industrial equipment, Purification, Formaldehyde, Culture media, USSR.

A possibility of obtaining chemical anthrax vaccine in semi-industrial conditions was investigated. Biosynthesis of the protective antigen, as well as other processes of anthrax metabolism were the same in 100-litre cultivators as in the 5-litre bottles. The immunological efficacy of the protective antigen obtained in the cultivators and bottles proved to be the same. Of all the methods used for sterilization of large volumes of the protective antigen (treatment with beta-propiolacton, merthiolate, formalin) the best results were obtained with formalin. Thus, the possibility of preparing chemical anthrax vaccine in semi-industrial conditions was established. (Author)

AD-618 652 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
ELECTRON MICROSCOPIC STUDY OF THE MORPHOLOGICAL CHANGES IN INTESTINAL BACTERIA AND ANTHRACOIDS FOLLOWING THE ACTION OF SOME PHENOL PREPARATIONS,
by E. K. Skvortsova and N. P. Likhacheva.
10 Mar 64, 7p Translation-1025
TT 65-62716

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 p88-91 1963.
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Descriptors: (*Enterobacteriaceae, Morphology(Biology)), (*Germicides, Enterobacteriaceae), Electron microscopy, Phenols, Resorcinol, USSR.

Phenol, resorcin, hexylresorcin and heptylresorcin caused various morphological changes in intestinal bacilli and anthracoides. The morphological changes of the bacterial cell following the action of the specified compounds were determined to a known level by the morphological peculiarities of the species of microorganisms. (Author)

AD-618 653 Div. 16/8, 16/4
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
MICROSURGICAL INSTRUMENTS AND ATTACHMENTS,
by A. B. Lange. 1963, 10p Translation-1027
TT 65-62717

Unclassified report

Trans. of Zoologicheskii Zhurnal (USSR) v42 n8 p1257-60 1963.

Descriptors: (*Surgical instruments, Arthropods), (*Arthropods, Surgical instruments), Invertebrates, Insects, Ticks, Surgical techniques, Laboratory equipment, Medical equipment, Microscopes, Pipettes, USSR.

Instruments and devices made and applied by the author for the preparation of small Arthropods are described: microsurgical instruments on the basis of surgical pincers, mounting for the fixation and ligature application on the subject operated, an adjustment for fixing the subject on the slide, micropipettes. (Author)

AD-618 654 Div. 16/8, 16/4
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
MICROSURGERY TECHNIQUE IN INSECTS,

by N. A. Tamarina. 1963, 10p Translation-1029
TT 65-62718

Unclassified report

Trans. of Zoologicheskii Zhurnal (USSR) v42 n8 p1260-4 1963.

Descriptors: (*Surgical techniques, Insects), (*Insects, Surgical techniques), Medical supplies, Surgical instruments, Pipettes, Arthropods, Larvae, USSR.

The combination of the equipment and single moments of work are described during microsurgical operations on insects (removal of organs, their transplantation, hemolymph transfusion, etc.). The construction of the microsurgical table suggested by the author is described. Some microsurgical procedures with the application of previously known and new instruments and devices are demonstrated on an operation on Calliphora erythrocephala larvae when transplanting corpora allata. (Author)

AD-618 672 Div. 16/2
CFSTI Prices: HC$3.00 MF$0.75

Army Biological Labs., Frederick, Md.
MICROBIOLOGICAL SAFETY BIBLIOGRAPHY,
by G. Briggs Phillips and Joseph V. Jemski.
Jul 65, 81p Miscellaneous Publication-6

Unclassified report

Descriptors: (*Biological laboratories, Safety), (*Biological contamination, Bibliographies), Medical laboratories, Medical technicians, Infections, Hazards, Laboratory animals, Laboratory equipment, Germicides, Ventilation, Ultraviolet radiation, Aerosol generators, Samplers, Respirators, Protective masks, Decontamination.

More than a thousand articles on biological safety in infectious disease laboratories are listed for the use of supervisors responsible for the safety of laboratory personnel. An author index is included. (Author)

AD-618 682 Div. 16/15, 16/1
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SUBSTANTIATION OF THE PROPOSED CROSS-CORRELATION MODEL OF THE HUMAN VISUAL SYSTEM.
Masters' thesis,
by Robert Larry Akin. Jun 65, 91p
Rept. no. GGC/EE/65-1

Unclassified report

Descriptors: (*Vision, Physiology), (*Bionics, Vision), Nervous system, Neurology, Pattern recognition, Feasibility studies, Eye, Optic nerve, Brain, Nerve cells, Visual perception, Colors, Brightness, Memory.

In 1963, Dr. Matthew Kabrisky proposed that cross correlation is the pattern-recognition calculation of the human visual system. A discussion of the visual system demonstrates that pattern recognition might be the total function of vision. The results of past neurophysiological research are presented, and it is shown that these results substantiate the concept of the cross-correlation model. An attempt to trace nerve pathways in the visual cortex of the monkey was made; and although no important results were obtained, it showed the feasibility of neurophysiological research and recommends future projects in this area. (Author)

07. Chemistry

AD-617 927 Div. 4/3
CFSTI Prices: HC$1.00 MF$0.50

University of Western Ontario, London. Dept. of Chemistry.
THE PHOTOCHEMICAL PRODUCTION OF STRAINED RINGS.
Final rept.,
by P. de Mayo. 3 May 65, 9p
Grants AF AFOSR99 63, AF AFOSR J1368,
Proj. 9762, Task 976203
AFOSR 65-0970

Unclassified report

Descriptors: (*Monocyclic compounds, Synthesis-(Chemistry)), (*Photochemistry, Monocyclic compounds), (*Ketones, Photochemistry), Alcohols, Pyrroles, Oxidation, Pyridines, S-meterocyclic compounds, Canada.

The object of the research was the photochemical synthesis of rings. It was found that intermolecular cycloaddition, a previously unknown phenomenon outside dimerization, could be induced photochemically. Whilst simple unsaturated ketones appeared unreactive the hydrogen bonded 'cyclic' ketone acetyl acetone could be induced to participate. Further, this diketone had the advantage that any hydrogen abstraction would give a diradical which would be immediately converted, by spin inversion, into the starting material. Two other unrelated photochemical studies are also reported: (1) the photosensitized oxidation of pyrrole, providing the structure of the product maleimide and the mechanism of oxidation; and (2) the dimerization of alpha-pyridones and sultones as a means of building cyclic systems.

AD-617 941 Div. 4/2, 10/6
CFSTI Prices: HC$2.00 MF$0.50

Amoco Chemicals Corp., Seymour, Ind. Propellants Div.
THE STUDY OF BORON PERCHLORATE AND RELATED SYSTEMS.
Final rept. for 1 Oct 61-30 Sep 64,
by R. A. Mosher, E. K. Ives, and E. F. Morello.
30 Sep 64, 30p
Contract AF49 638 1105, Proj. 9750, Task 975002
AFOSR 65-1055

Unclassified report

Descriptors: (*Boron compounds, Perchlorates), (*Perchlorates, Chemical properties), Synthesis-(Chemistry), Molecular structure, Physical properties, Thermochemistry, Decomposition, Stabilization, Spectra(Infrared), Solid rocket propellants.

The compounds BCl2ClO4, BCl(ClO4)2 and B(ClO4)3 prepared by the reaction between BCl3 and anhydrous HClO41. They are extremely sensitive to moisture undergoing rapid hydrolysis even at -78C. The compounds are also thermally unstable, where BCl2ClO4 decomposes with evolution of chlorine, BCl(ClO4)2 with evolution of chlorine and chlorine heptoxide and B(ClO4)3 with evolution of chlorine heptoxide. Density, refractive index, molecular weight and surface tension have been determined for the boron chloroperchlorates. Molar refractivity and the parachor were calculated for the chloroperchlorates and both give values which agree closely with values for the postulated compounds. Heat of hydrolysis was determined calorimetrically for BCl2ClO4 and from this, a value for the heat of formation was derived. The chloroperchlorates give solid adducts with (CH3)3N, the stability decreasing from BCl2ClO4 to BCl(ClO4)2. The triperchlorate did not form an adduct with trimethylamine but did form a somewhat stable adduct with nitronium perchlorate. The reaction of some non-metal halides and anhydrous HClO were investigated.

AD-617 952 Div. 4/4, 4/3
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
PHOTODEGRADATION OF HIGH POLYMERS. PART VI. PHOTOLYSIS OF POLYSTYRENE FILMS IN VACUUM AND IN AIR.
Interim rept.,
by R. B. Fox, L. G. Isaacs, F. E. Saalfeld, and M. V. McDowell. 16 Jun 65, 19p NRL rept no. 6284
Projs. RR001 02 43 4801, RR001 01 43 4804

Unclassified report

Descriptors: (*Styrene plastics, Photochemistry), (*Photochemistry, Styrene plastics), Polymers, Films, Degradation, Vacuum, Air, Ultraviolet radiation, Molecular properties, Mass spectroscopy.

Thin films of polystyrene have been photolyzed by 2537A radiation in vacuum and in air at 25, 80, and 120C. Random scission and crosslinking occur simultaneously, with oxygen acting to inhibit the latter process. In air, the apparent quantum yields for random scission, measured by viscosity changes, are 0.00009 and 0.0007 scissions per quantum absorbed at 25 and 120C, respectively. Crosslinks exceed scissions in vacuum, and no reduction in viscosity is observed; the ratio of crosslinks to scissions increases with temperature in the 25 to 120C range. During photolysis, hydrogen appears to be the major volatile product emanating from the polymer itself. Of the remaining volatile products, carbon monoxide, carbon dioxide, and methane probably arise from polymer imperfections; benzene and monomer are present as impurities rather than major photolysis products. Large variations in the product yields, which are very small on an absolute scale, and the detection of ethylene from one batch and acetylene from another emphasize the importance of small impurities and imperfections in the photolysis of a highly stable polymer such as polystyrene. Changes in the ultraviolet spectra during photlysis are compatible with the formation of conjugated double bonds along the main chain; in air, these changes are supplemented by oxidation which results in carbonyl formation along the chain and a relatively small fragment absorbing at about 340 millimicrons. (Author)

AD-617 964 Div. 4/2, 10/5
CFSTI Prices: HC$2.00 MF$0.50

Olin Mathieson Chemical Corp., New Haven, Conn. Chemicals Div.
STUDY OF SUPEROXIDIZERS.
Final rept. for 1 Dec 61-31 Jan 65,
by D. A. Csejka. 12 Mar 65, 39p
Contract AF49 638 1137, Proj. 9750, Task 975001
AFOSR 65-1050

Unclassified report

Descriptors: (*Oxidizers, Synthesis(Chemistry)), (*Peroxides, Chemical properties), Hydrogen peroxide, Hydrogen, Deuterium, Ozone, X-ray diffraction analysis, Nuclear magnetic resonance, Spectra(Infrared), Heat of formation, Ammonia, Chlorine, Oxygen, Halogenated hydrocarbons, Nitrogen compounds, Fluorides.

The reactions of hydrogen atoms with gaseous ozone and with oxygen were studied to determine if hydrogen superoxide (H2O4) could be obtained in higher yields. Attempts to concentrate H2O4 by separating it from its ice matrix were made. Hydrogen superoxide was examined by X-ray, nuclear magnetic resonance and infrared methods at low temperature in order to determine its structural characteristics. The heat of decomposition and

formation of H2O4 were determined at -196C. The reactions of H2O4 with ammonia, chlorine and ethylene were studied. Di-t-butyl tetroxide was prepared so that the O4 species could be examined by infrared spectroscopic techniques. The reactions of ozone with hexafluoroethane, ammonia, bromine trifluoride and chlorine trifluoride were studied. Tetrafluorohydrazine was treated with ozone, oxygen atoms, oxygen and potassium superoxide in an effort to prepare new oxides such as NF2ONF2, NF2OONF2 and NF2OOH. The preparation of chlorine tetroxide was investigated. Reactions of nitrogen trifluoride with ethane, ammonia and diborane at elevated temperatures were examined. (Author)

AD-617 972 Div. 4/4

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Chemistry.
THE HYDROLYSIS OF t-BUTYL CHLORIDE IN WATER: TEMPERATURE-DEPENDENCE OF THE ENERGY OF ACTIVATION,
by E. A. Moelwyn-Hughes, R. E. Robertson, and S. Sugamori. 29 Jun 64, 7p Rept. no. NRC-8293
Unclassified report

Pub. in Journal of the Chemical Society p1965-71 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Halogenated hydrocarbons, Hydrolysis), (*Hydrolysis, Halogenated hydrocarbons), Halides, Chlorides, Temperature, Heat of activation, Reaction kinetics, Thermodynamics.

The Paper reports the results of a careful determination of the temperature-dependence of the rate of hydrolysis of t-butyl chloride in water at 1 degree intervals between 0 and 20C. (Author)

AD-617 974 Div. 4/3, 25/7

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
SECONDARY IONS IN THE MASS SPECTRUM OF PROPANE,
by Keith R. Ryan and Jean H. Futrell. 21 Sep 64, 7p Rept. no. ARL-65-103
Unclassified report

Pub. in Journal of Chemical Physics v42 n3 p819-23 Feb 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Aliphatic compounds, Mass spectrum), (*Mass spectroscopy, Aliphatic compounds), Ions, Chemical reactions, Thermochemistry, Deuterated compounds.

The secondary spectra arising from ionic reactions in propane at several mean ion energies are reported. The results are compared with computed values taken from results obtained by the elegant techniques developed by Lindholm. From the comparison a calculation is made for the secondary spectrum obtained by bombarding C3H8 with C2H4(+) ions. Experiments using mixtures of C2D4 and C3H8 lead to an observed secondary-ion spectrum which is in good agreement with that calculated. A significant number of ionic fragments in the secondary spectrum appear to be formed by endothermic processes. It is assumed that translational energy supplies the required energy. Some appearance-potential measurements support this assumption. There appears to be some evidence for CH3(-) transfer when C3H8 is bombarded either by C2H5(+) or C2H4(+). In both cases there is also a competing H(-) transfer process. (Author)

AD-617 975 Div. 4/3

Kansas State Univ., Manhattan.
THE SYNTHESIS AND THERMAL DECOMPOSITION OF THE SODIUM SALTS OF SOME N-(P-TOSYL) HYDRAZIMIDOCARBOXYLATE ESTERS. Revised ed.,
by Richard N. McDonald and Robert A. Krueger. 12 Feb 65, 7p
Grant AF AFOSR145 63
AFOSR 65-0883
Unclassified report

Pub. in Tetrahedron Letters n14 p857-61 1965 (Copies available only to DDC users).
Revision of manuscript submitted 7 Jan 65.

Descriptors: (*Hydrazine derivatives, Synthesis-(Chemistry)), (*Organic nitrogen compounds, Pyrolysis), (*Organic sulfur compounds, Pyrolysis), Sodium compounds, Salts, Esters.

A convenient synthesis of N'-(p-tosyl)hydrazimido carboxylate esters (CH3PhSO2NHN=C(R)2) is described and results of studies on the thermal decomposition of the sodium salts of three of these esters are given. The compounds are of possible value for the generation of carbenes.

AD-617 976 Div. 4/2

McGill Univ., Montreal (Quebec). Inorganic Chemistry Lab.
THE INTERACTION OF HYDRAZINE WITH BORON AND ALUMINUM HALIDES,
by W. G. Paterson and M. Onyszchuk. 26 Feb 63, 6p
Grant DBR9530 20, Proj. D46 95 30 20
Unclassified report

Pub. in Canadian Journal of Chemistry v41 p1872-6 1963 (Copies available only to DDC users).

Descriptors: (*Hydrazine, Chemical reactions), (*Boron compounds, Halides), (*Aluminum compounds, Halides), Chlorides, Bromides, Iodides, Elimination reactions, Nitrogen compounds, Inorganic polymers, Canada.

The interaction of boron halides BX3 (where X is Cl or Br) or aluminum halides Al2X6 (where X is Cl, Br, or I) with hydrazine is characterized by the elimination of hydrogen halide and the formation of substances with boron-(or aluminum-) nitrogen linkages. The hydrogen halide appears in the products as hydrazine hydrohalide, which can be separated by a hydrazine washing technique, leaving a polymeric material with empirical formula MN4H5 (where M is Al or B). A reaction scheme is proposed and possible structures of this polymeric product are discussed. (Author)

AD-617 986 Div. 4/4, 4/3, 16/3

California Univ., Riverside. Dept. of Chemistry.
THE IONIZATION OF ORGANIC MOLECULAR CRYSTALS BY NEAR U.V. LIGHT,
by David R. Kearns. 27 Jul 64, 9p
Grants DA AROD31 124G511, PHS GM10499
AROD 4719:2
Unclassified report

Rept. presented at Symposium on Molecular Mechanisms on Photobiology, Wakulla Springs, Fla., 16-21 Feb 64. Pub. in Photochemistry and Photobiology v3 p307-15 1964 (Copies available only to DDC users).

Descriptors: (*Photochemistry, Ionization), (*Polycyclic compounds, Photochemistry), (*Luminescence, Polycyclic compounds), Ultraviolet radiation, Photoconductivity, Quenching(Inhibition), Atomic energy levels, Crystals.

AD-617 989 Div. 4/3

Carnegie Inst. of Tech., Pittsburgh, Pa.
ELECTRONIC EFFECTS IN E2 REACTIONS. II. t-BUTOXIDE-INDUCED ELIMINATIONS OF 2-METHYL-3-PENTYL ARENESULFONATES,
by Allan K. Colter and Donald R. McKelvey.
13 Nov 64, 12p
AROD 2336:3

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1282-92 1965 (Copies available only to DDC users).

Descriptors: (*Sulfonates, Elimination reactions), (*Elimination reactions, Sulfonates), Atomic orbitals, Electrons, Alkenes, Synthesis(Chemistry), Potassium compounds, Butanols, Salts, Reaction kinetics.

As part of a study of the influence of electronic effects imposed by the leaving group on orientation in E2 reactions, a study of elimination in a series of 2-methyl-3-pentyl arenesulfonates was carried out. The compositions of the olefin mixtures resulting from reaction of selected members of this series with potassium t-butoxide in t-butanol, 50% (by volume) t-butanol-dioxane, 25% (by volume) t-butanol-dioxane, and 25% (by volume) t-butanol-dimethyl sulfoxide, at 50C, were determined using vapor phase chromatography. Second-order rate constants were measured for these reactions in t-butanol, and 50% t-butanol-dioxane at 50C and in 25% t-butanol-dimethyl sulfoxide at 25C. The compositions of the olefin mixtures vary in a fairly regular way with changes in the electronic nature of the leaving group, the fraction of 2-methyl-2-pentene and ratio of trans- to cis-4-methyl-2-pentene for the most part increasing with increasing electron withdrawal. The E2 reactions in 25% t-butanol-dimethyl sulfoxide produce trans- and cis-4-methyl-2-pentene in ratios (20 to 35) considerably higher than those in an equilibrium mixture (ca. 6). The results are discussed in terms of recent views on the E2 transition state. (Author)

AD-617 999 Div. 4/4

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
HELIUM AFTERGLOW AND THE DECAY OF THE ELECTRON ENERGY.
Revised ed.,
by J. C. Ingraham and Sanborn C. Brown. 8 Jan 65, 8p
Contracts DA36 039AMC03200E, AF19 604 5992

Unclassified report

Pub. in Physical Review v138 n4A pA1015-22 May 17 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Phosphorescence, Helium), (*Helium, Phosphorescence), Electromagnetic pulses, Direct current, Gas discharges, Electrons, Atomic energy levels, Electron transitions.

The electron energy decay in the afterglow of a pulsed dc discharge in helium has been studied over a pressure range from 0.03 mm to 5 mm Hg. The energy decay is found to be influenced by cooling due to electron-atom elastic recoil and heating due either to electron-metastable superelastic collisions at low pressures or to the ionizing collision between two metastable atoms at high pressures. The analysis allows for the deviation of the electron velocity distribution from Maxwellian resulting from these heating effects. (Author)

AD-618 007 Div. 4/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ORGANOSILICON DERIVATIVES OF DICYCLOPENTADIENYL IRON,
by Wu Guan-lee. 7 Jul 65, 19p
Rept. no. FTD-TT-64-1345
TT 65-62630

Unclassified report

Edited trans. of Hua Hsueh T'ung Pao (Chinese People's Republic) n5 p293-301 1963. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Metalorganic compounds, Synthesis-(Chemistry)), (*Synthesis(Chemistry), Metalorganic compounds), Ferrocenes, Silanes, Hydrolysis, Oxides, Siloxanes, China.

AD-618 038 Div. 4/4, 25/2, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
ON THE ANISOTROPY OF EXCHANGE IN YTTERBIUM IRON GARNET.
Technical rept.,
by Peter M. Levy. Jul 65, 10p Rept. no. TR-24
Contract Nonr55136

Unclassified report

Descriptors: (*Ion exchange, Ytterbium), (*Anisotropy, Garnet), (*Garnet, Iron), Exchange reactions, Atomic energy levels, Crystal lattices, Potential theory.

The exchange splittings of the lowest 2F5/2 and 2F7/2 doublets of Yb(3+) in YbIG are evaluated in terms of the exchange potential parameters as given in a previous article. The wave functions of White, and Hutchings and Wolf were used. A good four parameter fit of the experimental exchange splittings is obtained by adopting essentially zero values for the rare-earth-iron exchange interactions that take place through the nearest neighbor oxygen ions. The chief result of this analysis is that the rare-earth-iron exchange interaction takes place primarily through the next-nearest neighbor oxygens (2.43A); the nearest neighbor oxygens (2.37A) are comparatively inert. (Author)

AD-618 041 Div. 4/2, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Princeton Univ., N. J.
INORGANIC STRUCTURE AND SPECTRA.
Final technical rept. for 1 Jan 63-31 Dec 64,
by William DeW. Horrocks, Jr. 31 Dec 64, 5p
Grant AF AFOSR242 63, Proj. 9710, Task 971001
AFOSR 65-0980

Unclassified report

Descriptors: (*Complex compounds, Molecular structure), (*Inorganic compounds, Molecular structure), (*Molecular structure, Inorganic compounds), (*Spectroscopy, Inorganic compounds), Transition metals, Infrared spectroscopy, Chemical bonds, Bibliographies.

A list of publications generated under the grant is given, and a number of unpublished studies are briefly summarized. The work is concerned largely with transition metal complexes.

AD-618 042 Div. 4/3
CFSTI Prices: HC$1.00 MF$0.50

Consejo Superior de Investigaciones Cientificas, Barcelona (Spain). Departamento de Quimica Organica.
SNYTHESIS AND PROPERTIES OF ALKAROMATIC CHLOROCARBONS.
Final rept.,
by Manuel Ballester. 30 Nov 64, 19p
Contract AF61 052 749
ARL 65-161

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Halogenated hydrocarbons, Synthesis-(Chemistry)), (*Chlorine compounds, Polycyclic compounds), (*Polycyclic compounds, Chlorination), Photochemistry, Free radicals, Chemical properties, Stability, DDT, Spain.

The synthesis of twenty four (24) new chlorinated derivatives of diphenylmethane, fluorene, biphenyl, 1,1-diphenylethane, 1,1-diphenylethylene, acenaphthene, acenaphthylene, triphenylmethane and triptycene is here reported. Among them there are ten (10) chlorocarbons, including two (2) anions, one (1) cation and two (2) free radicals. The most outstanding result is the chemical inertness of the chlorocarbon free radicals (perchlorodiphenylmethyl, or PDM, and perchlorotriphenylmethyl, or PTM). (Author)

AD-618 060 Div. 4/4, 25/6, 14/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INVESTIGATION OF VARIOUS TYPES OF ADHESION BONDS,
by N. A. Krotova, L. P. Morozova, A. M. Polyakov, G. A. Sokolina, and N. N. Stefanovich. 6 Jul 65, 18p
Rept. no. FTD-TT-65-327
TT 65-62644

Unclassified report

Unedited rough draft trans. of Kolloidnyi Zhurnal (USSR) v26 n2 p207-14 1964.

Descriptors: (*Adhesion, Surface properties), USSR, Polymers, Plastics, Glass, Semiconductors, Bonding, Diffusion, Test methods.

Several phenomena at the polymer-solid substrate interface has been investigated with the objective of elucidating the mechanism of adhesion. It has been established by IR spectroscopy that adhesion of polymers is largely due to chemical (donor-acceptor) interactions. The adhesion can therefore be controlled by rational selection of the functional groups of the adhesive and substrate on the basis of their donor-acceptor properties. The change in characteristics of a semiconductor on formation of adhesion bond between it and the polymer and the part played by the functional groups of the polymer, responsible for the degree of charge of the surface, have been determined. The effect of the functional groups of the polymer on the intensity of electron emission observed on breakdown of the adhesion bond has been investigated by a novel method. (Author)

AD-618 095 Div. 4/4, 30/5, 25/4
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A PHASE SHIFT METHOD OF DETERMINING MILLICROSECOND FLUORESCENT LIFETIMES OF ORGANIC SUBSTANCES IN AERATED SOLUTIONS.
Master's thesis,
by Grant David Callin. Mar 65, 96p
Rept. no. GSP-PH-65-4

Unclassified report

Descriptors: (*Polycyclic compounds, Fluorescence), (*Fluorescence, Measurement), Organic compounds, Liquids, Test equipment, Phase shift, Modulators, Photomultipliers, Preamplifiers, Oscillators, Mixers-(Electronic), Amplifiers, Phase shifters, Phase detectors, Errors.

An apparatus is presented to measure fluorescent lifetimes of organic substances in aerated solutions. The apparatus employs the phase shift method of measurement, which is useful for determining lifetimes in the range of 10 to the -7th to 10 to the -9th seconds. When a fluorescent substance is irradiated by light modulated at frequency omega, the fluorescence is modulated at the same frequency but phase-shifted by an angle phi. This angle is measured by the electrical system of the apparatus, and omega is known; the lifetime upsilon is then calcu..ated with the phase shift formula tan phi = omega(upsilon). The phase shift apparatus is described with respect to function, performance, and error sources, and an experimental procedure is recommended for use with the device. The fluorescent lifetime of perylene was measured to evaluate the system performance and found to be 5.1 ± 0.5 x 10 to the -9th seconds. This value was in close agreement with that found by Ware for the same substance, using the same method of measurement. (Author)

AD-618 123 Div. 4/4

Loyola Coll., Montreal (Quebec). Dept. of Chemistry.
THE BEHAVIOR OF LEAD ELECTRODES IN SULPHURIC ACID SOLUTIONS,
by K. Ekler. 1 Aug 63, 11p
Grant DBR5480 14

Unclassified report

Pub. in Canadian Journal of Chemistry v42 p1355-64 1964 (Copies available only to DDC users).

Descriptors: (*Electrodes, Electrochemistry), (*Sulfuric acid, Electrodes), (*Lead, Electrodes), Voltage, Oxidation, Anodes(Electrolytic cell), Lead compounds, Oxides, Sulfates, Electrical discharges, Canada.

Lead electrodes were anodically etched in NH2SO3H. Immersion potentials, self-passivation potentials, passivation times, PbO2/O2 potential, and the potential of the first discharge plateau were determined in H2SO4 solutions ranging from 0.5 to 20.0N and were found to be concentration-dependent. Interruption of the anodizing current had no detectable influence on passivation time. Data obtained with the anodizing current turned on fall into three on passivation time. Data obtained with the anodizing current turned on fall into three categories; those obtained with (1) short-immersion anodes, (2) anodes which had reached a hydrogen-like potential, and (3) anodes which were self-passivated before the current was switched on. An inflection in the relation between potential and time during charging was investigated. Its length was dependent upon acid concentration and current density, while its potential was +300 ± 30 mv, and seemed to correspond to the self-passivation potential. The lengths of the first and second discharge plateaus increased with the number of coulombs passed and were dendent upon acid concentration, but were identical for electrodes treated by four different methods. The hydrogen-like potential appeared to be due to the presence of PbO.PbSO4. The self-passivation potential seemed to be caused by formation of PbO. (Author)

AD-618 144 Div. 4/4, 4/2

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
AN INFRARED STUDY OF CO ADSORBED ON SURFACES OF ZINC OXIDE. INFLUENCE OF PRE-OXIDATION AND DOPING,
by C. H. Amberg and D. A. Seanor. 1964, 14p
Rept. no. NRC-8029
Unclassified report

Pub. in Proceedings of the International Congress on Catalysis (3rd), Amsterdam, 20-25 Jul 1964. (Copies available only to DDC users).

Descriptors: (*Catalysts, Adsorption), (*Zinc compounds, Oxides), (*Carbon compounds, Monoxides), (*Infrared spectroscopy, Monoxides), Impurities, Lithium compounds, Gallium compounds, Oxidation, Band spectrum, Complex compounds, Carbon dioxide, Canada.

The adsorption of CO on pure as well as Li2O- and Ga2O3-doped zinc oxides was studied at 30C following various oxidative and reductive pre-treatments. The use of a null-reading quartz spring microbalance in combination with an infrared grating spectrometer permitted the simultaneous measurement of amounts adsorbed and infrared transmission. Integrated band intensities thus obtainable for weakly adsorbed CO species were consistent with the proposed dipolar nature of the interaction; both frequencies and intensities varied with pretreatment, but were uniquely dependent on each other irrespective of substrate. A slow oxidation process on pure zinc oxide surfaces resulting in electron donation to the solid was followed by means of the infrared absorption of the free carriers; the oxidation was thought to lead to a surface donor complex of the metal carbonato type, with weakly adsorbed CO molecules playing the part of a reaction intermediate in its formation. The complex itself must be regarded as a possible precursor in the formation of CO2. (Author)

AD-618 155 Div. 4/4, 4/3

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
THE RADIOLYSIS OF PROPANE AT EXTREMELY LOW CONVERSIONS,
by L. W. Sieck, N. K. Blocker, and J. H. Futrell.
5 Sep 64, 7p Rept. no. ARL-65-102
Unclassified report

Presented at the Annual Meeting of the Radiation Research Society (12th), Miami Beach, Fla. May 17-20, 1964.
Pub. in Journal of Physical Chemistry v69 p888-92 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Aliphatic compounds, Radiation chemistry), (*Radiation chemistry, Aliphatic compounds), Vapors, Decomposition, Disproportionation, Reaction kinetics, Ions, Free radicals.

The gas phase radiolysis of propane was investigated at extremely low conversions in order to determine initial G values. Yields of unsaturated products are found to be significantly higher than those obtained in the presence of added scavengers, and the differences can be correlated with radical-disproportionation reactions. Dose dependence is discussed in some detail and possible explanations for the variations in yield are offered. Although no detailed mechanism is advanced, the quantitative yield data upon which the mechanism must rest are presented. (Author)

AD-618 165 Div. 4/2

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
COMPLEXES OF BORON TRIFLUORIDE WITH FLUOBORATES,
by S. Brownstein and J. Paasivirta. 23 Dec 64, 6p
Rept. no. NRC-8366
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1645-9 1965 (Copies available only to DDC users).

Descriptors: (*Boron compounds, Fluorides), (*Fluoborates, Complex compounds), (*Complex compounds, Fluoborates), Heat of formation, Enthalpy, Spectra(Infrared), Nuclear magnetic resonance, Molecular structure, Canada.

The occurrence of complexes of boron trifluoride with some fluoborates was established. Enthalpies of formation were determined for some of these complexes. Infrared and fluorine resonance spectra were obtained in an attempt to elucidate the structures of the complexes. (Author)

AD-618 166 Div. 4/4, 4/2, 25/7

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
ELECTRON SPIN RESONANCE SPECTRA OF 15N-CENTERED RADICALS AT LOW TEMPERATURES. I. THE RADICAL NH3(+) TRAPPED IN NH4ClO4,
by M. Fujimoto and J. R. Morton. 8 Oct 64, 7p
Rept. no. NRC-8314
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1012-6 1965 (Copies available only to DDC users).

Descriptors: (*Ammonium compounds, Nuclear magnetic resonance), (*Nitrogen, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Ammonium compounds), Free radicals, Ions, Perchlorates, Nuclear spins, Absorption spectra, Cryogenics, Canada.

The electron spin resonance spectrum of NH3(+) trapped in ammonium perchlorate (95% N15) was examined at 300K, 77K, and 4K. The Spectra are interpreted in terms of pi-radical theory, and demonstrate the different stages in the freezing-out of the rotational motion of the ion. (Author)

AD-618 170 Div. 4/3

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Chemistry.
THE TETRAENOIC ACID OF TECOMA STANS SEED OIL,
by C. Y. Hopkins and Mary J. Chisholm. 1965, 5p
Unclassified report

Pub. in Journal of the Chemical Society p907-10 Feb 1965 (Copies available only to DDC users).

Descriptors: (*Vegetable oils, Separation), (*Fatty acids, Molecular structure), Trees, Seeds, Nuclear magnetic resonance, Chemical bonds, Molecular isomerism, Canada.

A fatty acid, isolated from the seed oil of Tecoma stans (L.) H.B.K., is shown to be the hitherto unknown octadeca-trans-3,cis-9,cis-12,cis-15-tetraenoic acid. It constitutes about 19% of the total fatty acids. (Author)

AD-618 179 Div. 4/4, 25/7

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.

EFFECT OF TRANSLATIONAL ENERGY ON ION-MOLECULE REACTION RATES. I,
by Keith R. Ryan and Jean Futrell. 21 Sep 64, 8p
Rept. no. ARL-65-104
Unclassified report

Pub. in Journal of Chemical Physics v42 n3 p824-9 Feb 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Methane, Reaction kinetics), (*Ion beams, Reaction kinetics), (*Molecules, Reaction kinetics), (*Reaction kinetics, Energy), Electron bombardment, Thermochemistry, Electric fields, Water vapor, Gas ionization, Recombination reactions, Deuterium, Ammonia, Aldehydes, Neon.

The specific reaction rates for reactions between ions and molecules when both the reacting partners have thermal energy only were determined for several systems. These rates were determined by using a combination of a pulsed ionizing beam followed by a variable time-delay ion-extraction pulse. The results are compared with the field strength dependent values obtained in the same source operated in the conventional manner. The apparent thermal rate constant for the reaction CH4(+)1CH4 yields CH5(+)+ CH3 is 9.6x10 to the -10 cu. ch/molecule/sec, but after correction is amde for detector discrimination, the value becomes 17.0x10 to the -10 cu. cm/molecule/sec. For the field strength dependent values the magnitude of the ionizing current has a strong effect upon the observed specific reaction rate. Operation under conditions where the ionizing current is 0.1 micro-A led to reproducible values for the specific reaction rates. (Author)

AD-618 233 Div. 4/4, 25/7

GM Defense Research Labs., Santa Barbara, Calif.
VIBRALUMINESCENCE OF C02 AND N20 IN ACTIVE NITROGEN.
Technical rept.,
by E. L. Milne, M. Steinberg, and H. P. Broida.
17 Nov 64, 2p Rept. no. TR-10
Contract Nonr422201, ARPA Order 125
Unclassified report

Pub. in Journal of Chemical Physics v42 n7 p2615-6 Apr 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Luminescence, Nitrogen), (*Nitrogen, Luminescence), (*Nitrogen compounds, Oxides), (*Carbon dioxide, Luminescence), Atomic energy levels, Excitation, Vibration, Infrared radiation, Band spectrum.

The addition of C02 and N2O to active nitrogen is known to produce a considerable heat release which has been attributed to an enhanced degradation of vibrationally excited N2 molecules. The excitation of the infrared-active gases was studied in the Lewis-Rayleigh, orange, and pink afterglows of N2, and a series of experiments was carried out to identify the source of the excitation of CO2 and N2O in the active nitrogen.

AD-618 249 Div. 4/4, 4/3

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
EFFECT OF PRESSURE ON THE HYDROLYSIS OF THE ETHYLENEIMINIUM ION,
by B. T. Baliga, A. K. Rantamaa, and E. Whalley.
8 Oct 64, 4p Rept. no. NRC-8402
Unclassified report

Pub. in Journal of Physical Chemistry v69 n5 p1751-3 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*N-heterocyclic compounds, Hydrolysis), (*Hydrolysis, Pressure), Ions, Reaction kinetics, Volume, Chemical bonds, Canada.

The bulk of evidence indicates that the hydrolysis of the ethyleneiminium ion occurs by the bimolecular attack of a molecule of water; however the volume of activation is in the range expected for the unimolecular decomposition of an ion. An interpretation is given for this phenomenon, in addition to the results of a remeasurement of the volume of activation.

AD-618 253 Div. 4/3

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
TETRACYCLOHEXYLMETHANE,
by Glen R. Buell and Leonard Spialter. 18 Nov 64, 3p Rept. no. ARL-65-144
Unclassified report

Pub. in Journal of Organic Chemistry v30 p1662 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Polycyclic compounds, Synthesis-(Chemistry)), Cyclohexanes, Methane, Spectroscopy, Stereochemistry, Hydrogenation, Dehydrogenation, Catalysis, Molecular structure.

Tetraphenylmethane, in the presence of 5% rhodium on charcoal, was catalytically hydrogenated at 100C to give 80% of the theoretical yield of tetracyclohexylmethane (m.p. 282C). Some of the properties of this new compound were investigated.

AD-618 270 Div. 4/4, 16/3, 30/3

Walter Reed Army Inst. of Research, Washington, D. C.
COULOMETRIC CALIBRATION OF MICROPIPETTES,
by Gary D. Christian. 19 Nov 64, 6p
Unclassified report

Pub. in Microchemical Journal v9 n1 p16-21 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Volumetric analysis, Laboratory equipment), (*Laboratory equipment, Calibration), Electrochemistry, Potassium compounds, Chromates, Molybdenum, Electric currents.

A coulometric method is described for the direct calibration of micropipettes. The only volumetric measurements made are in the preparation of the standard solution and in the pipetting of the sample for titration. No calibration of the instrument is required. Pipettes of 200-0.5 micro-l volume can be calibrated with an accuracy to four significant figures. There is no practical limit of the smallness of the volume which can be calibrated. Recommended generating currents are given for different sized volumes to be calibrated. (Author)

AD-618 346 Div. 4/3, 4/4

Rochester Univ., N. Y.
THE PHOTOCHEMISTRY OF METHYL ISOPROPYL KETONE,
by A. Zahra and W. Albert Noyes, Jr. 2 Oct 64, 7p
Grant AF AFOSR206 63
AFOSR 65-0884 Unclassified report

Pub. in Journal of Physical Chemistry v69 n3 p943-8

Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ketones, Photochemistry), (*Photochemistry, Ketones), Dissociation, Aldehydes, Alkenes, Atomic energy levels, Free radicals, Emissivity.

The photochemistry of methyl isopropyl ketone (3-methyl-2-butanone) is contrasted with that of 2-pentanone since the former, as distinguished from the latter, may not undergo a Norrish Type II reaction. The main reactions are those one would expect from photochemical dissociation into radicals but there is also almost certainly some direct dissociation into acetaldehyde and propylene by a process designated by Norrish as Type III. By the addition of oxygen and of biacetyl it is possible to show that a triplet state as well as a singlet state must be considered in any detailed mechanism of the photochemistry of this ketone. Some suggestions are made as to the role each one plays. Analyses were performed for carbon monoxide, methane, ethane, propylene, and propane. The propylene always exceeds the propane so that these two gases are not formed solely by disproportionation of isopropyl radicals. (Author)

AD-618 356 Div. 4/4, 4/3

Pennsylvania State Univ., University Park.
d-ORBITAL PARTICIPATION IN SILANE CONJUGATION,
by Lionel Goodman, Aaron H. Konstam, and Leo H. Sommer. 5 Oct 64, 6p
Grant AF AFOSR62 39
AFOSR 65-0877

Unclassified report

Pub. in Journal of the American Chemical Society v87 n5 p1012-6 Mar 5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Silanes, Molecular association), (*Molecular spectroscopy, Silanes), Aromatic compounds, Substitution reactions, Atomic orbitals, Perturbation theory, Electron transitions, Atomic energy levels, Spectra(Visible + ultraviolet).

A substituent interference experiment on the intensity of the 1Lb bands in phenylsilanes demonstrates that the SiH3 group actually does withdraw electrons from the benzene ring into Si 3d-orbitals. Such an experiment has general applicability for ascertaining participation of d-orbitals in a conjugation scheme. (Author)

AD-618 401 Div. 4/2, 25/7
CFSTI Prices: HC$4.00 MF$1.00

Tennessee Univ., Knoxville.
LINE INTENSITY AND PRESSURE BROADENING STUDIES IN HYDROGEN FLUORIDE AND OTHER PROBLEMS IN INFRARED SPECTROSCOPY.
Final rept. for 1 Jan 61-31 Jan 65,
by Alvin H. Nielsen, Robert J. Lovell, Norman M. Gailar, W. Edward Deeds, and William F. Herget.
31 Mar 65, 119p
Contract AF19 604 7981, Proj. 7670, Task 767002
AFCRL 65-360

Unclassified report

Descriptors: (*Hydrogen compounds, Fluorides), (*Fluorides, Line spectrum), (*Infrared spectroscopy, Line spectrum), Intensity, Geometric forms, Vacuum apparatus, Band spectrum, Spectra(Infrared), Pressure, Tritiated compounds, Halogenated hydrocarbons, Carbon dioxide, Oxides, Chlorides.

The principal activity under the contract was to carry out experiments which would give information about the shapes, shifts, and effects of self-broadening of spectral lines using the vibration-rotation lines in the fundamental infrared band of Hydrogen Fluoride as the medium for measurement. All measurements were made with a high-dispersion vacuum-grating infrared spectrometer capable of resolution to something bett than 0.1/cm in the region of the HF fundamental. Slit functions were carefully determined using absorption lines from the fundamental of CO at very low pressures. Computational methods were developed making it possible to determine true line shapes accurately. Measured line shapes were compared with predicted Lorentz line shapes. The Lorentz parameter was obtained by the equivalent-width method for the pressure broadened spectral lines in the HF fundamental from m = -6 to m = +12. Investigations of the infrared spectra of several molecules such as CO2, T2O, CH3C1 are included. Molecular constants are listed. (Author)

AD-618 409 Div. 4/4, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Laboratory for Insulation Research, Mass Inst. of Tech., Cambridge.
THE DIELECTRIC SPECTRA OF WATER-ETHANOL MIXTURES IN THE MICROWAVE REGION,
Technical rept.,
by Douglas E. Buck. Jun 65, 20p
Rept. no. TR-200
Contracts AF33 616 8353, Nonr184110,
Proj. NR018 801

Unclassified report

Descriptors: (*Dielectrics, Microwave spectroscopy), (*Water, Dielectric properties), (*Alcohols, Dielectric properties), (*Microwave spectroscopy, Dielectrics), Mixtures, Relaxation time, Molecular association, Supercooling, Ice, Dipole moments.

The dielectric constant and loss were measured at 8.5, 3.0, 1.0, and 0.3 kMc/sec for solutions of ethanol and water as a function of concentration and temperature. The mixtures exhibit a distribution of relaxation times as opposed to single time constants for the pure components. The distribution of time constants was resolved as the superposition of two dispersions, each having a single time constant. The intensity and time constant of the two dispersions were found as a function of temperature and concentration and explained in terms of a mechanism in which hydrogen bonds are broken and allowed to reorient. In addition, the dielectric constant and loss were measured for water from 5 to-5C, and no abnormal behavior was noted at 4C or in the supercooled state. (Author)

AD-618 427 Div. 4/4, 25/7

California Inst. of Tech., Pasadena.
LORENTZ-LORENZ FUNCTIONS FOR SIMPLE MOLECULES IN THE LIQUID AND GASEOUS STATES,
by C. M. Knobler, C. P. Abbiss, and C. J. Pings.
24 Mar 64, 2p

Unclassified report

Pub. in Journal of Chemical Physics v41 n7 p2200-1 Oct 1 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Refractive index, Functions), (*Molecules, Refractive index), (*Liquids, Refractive index), (*Gases, Refractive index), Argon, Methane, Carbon tetrachloride, Nitrogen, Oxygen, Hydrogen, Phase studies, Density.

Preliminary measurements of the refractive index of some simple liquids and an analysis of data in the literature show unequivocally that there is a decrease in the Lorentz-Lorenz (LL) function on going from the gaseous state at high temperature to the liquid state at low temperature. The method of minimum deviation was used to measure the refractive index of liquid CH4 and CF4 along the saturation curve and of Ar along isotherms above and below the critical temperature. For Ar, Levelt's density measurements were used, while for CH4 the values listed by Rowlinson were chosen. In the case of CF4 the LL function is based on three measurements in the region where Croll and Scott's measurements are applicable. Also given are LL values for N2, O2, and H2 taken from Johns and Wilhelm. Their reported values for H2 were revised in accordance with more recent density data. The data show that the liquid LL function is less than that of the gas at 0°C by the order of 1% or more, except for H2, where a change of about 0.4% is found. (Extracted).

AD-618 442 Div. 4/3, 4/4

Minnesota Univ., Minneapolis. School of Chemistry.
EFFECT OF MOLECULAR ACID-BASE DISSOCIATION OF SALTS ON CONDUCTOMETRIC TITRATION CURVES IN ACETONITRILE,
by I. M. Kolthoff and M. K. Chantooni, Jr. 24 Apr 64, 11p
Grant AF AFOSR28 63, Proj. 9710, Task 971003
AFOSR 65-0880

Unclassified report

Pub. in Journal of the American Chemical Society v87 n5 p1004-12 Mar 5 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nitriles, Volumetric analysis), (*Acid-base equilibrium, Nitriles), (*Dissociation, Nitriles), (*Volumetric analysis, Acid-base equilibrium), Salts, Molecules, Electrochemistry, Benzoates, Pyridines, Amines, Electrical conductance, Quantitative analysis.

The main objectives of the paper are to calculate Kf and Kd from the characteristics of conductometric titration curves at different initial concentrations of acid. Equations were derived to find, under specified conditions, Kf from the location of and Kd from the value of the conductance at the maximum. Also, under specified conditions the product KfKd can be evaluated from the initial slope of the titration curve. Kf can then be calculated using a value of Kd obtained from the conductance at the maximum. A simple relation between KdKf in acetonitrile and the acid strength of BH(+) in water is derived and confirmed experimentally. Furthermore, with experimentally determined values of K2, Kd, and Kf and the independently measured ionic mobilities of A(-), HA2(-), and BH(+), titration curves were computed for comparison with those observed. (K2 = homoconjugation constant; Kd = dissociation constant; Kf = dissociation constant).

AD-618 444 Div. 4/4, 25/7, 4/2

Frick Chemical Lab., Princeton Univ., N. J.
ISOTROPIC SHIFTS OF SOME IONIC COMPLEXES OF COBALT(II) AND NICKEL(II): EVIDENCE FOR ION PAIRING,
by Gerd N. La Mar. 15 Jul 64, 9p
Grant AF AFOSR242 63, Proj. 9710, Task 971001
AFOSR 65-0885

Unclassified report

Pub. in Journal of Chemical Physics v41 n10 p2992-8 Nov 15 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Complex compounds, Nuclear resonance), (*Cobalt compounds, Nuclear resonance), (*Nickel compounds, Nuclear resonance), (*Nuclear resonance, Complex compounds), Ammonium compounds, Phosphines, Iodides, Band spectrum, Ions, Molecular association, Protons, Nuclear spins.

Isotropic proton resonance shifts have been observed for the ionic complexes, /Bu4N/ /(phi 3P)CoI3/ and /Bu4N/ /(phi 3P)NiI3/. In addition to the phenyl (phi) proton shifts for the complex anions, isotropic shifts were observed for the cation protons as well. These shifts for the tetra-n-butylammonium cations are interpreted as arising solely from a pseudocontact interaction with the metal in the complex anion through partial ion pairing in the deutero-chloroform solutions. From the magnitudes of the shifts for the butyl protons, an estimate is made for the relative extent of g-tensor anisotropies for the two anionic complexes. The observed shifts for the phenyl protons are interpreted as arising from both contact and pseudocontact interactions. Based on the postulate that the unpaired spin will distribute itself in a like manner in a given ligand whether attached to cobalt or nickel, and using the estimate of the relative anisotropies of the two metals, the phenyl proton shifts are separated into their respective contact and pseudocontact contributions. The resulting unpaired spin densities on the phenyl rings compare well with those reported for the related bis(triphenylphosphine) complexes. (Author)

AD-618 448 Div. 4/4, 25/3, 7/1

British Columbia Research Council, Vancouver.
CONDENSER PRESSURE AS AN EXPLANATION OF FIELD DEPENDENT TAFEL SLOPES OF HIGH FIELD IONIC CONDUCTION OF ANODIC TANTALUM PENTOXIDE FILMS,
by L. Young. 14 Feb 63, 2p

Unclassified report

Pub. in Journal of the Electrochemical Society v110 n6 Jun 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Tantalum capacitors, Ionic current), (*Oxides, Films), (*Ionic current, Tantalum capacitors), Anodes, Electrochemistry, Pressure, Electric fields, Heat of activation, Reaction kinetics, Canada.

AD-618 547 Div. 4/2, 4/4
CFSTI Prices: HC$4.00 MF$1.00

Johns Hopkins Univ., Baltimore, Md.
THE REACTION OF THE HD(+) ION WITH VARIOUS RARE GASES,
Doctoral thesis,
by Michael A. Berta. 1965, 131p

Unclassified report

Descriptors: (*Deuterated compounds, Chemical reactions), (*Helium group gases, Chemical reactions), (*Mass spectroscopy, Helium group gases), Isotopes, Thermochemistry, Helium, Neon, Argon, Krypton, Complex compounds, Ions, Excitation, Probability.

The reactions X + HD(+) yields XH(+) + D, X + HD(+) yields XD(+) + H; where X is He, Ne, Ar, and Kr, were studied in a two-stage mass spectrometer. In these mass transfer reactions, attention was focused on the isotope effect and the XH(+)/XD(+) ratio was determined as a function of the kinetic energy of the HD(+) ion in the range 2 to 20 eV. The results were interpreted in terms of complex formation and the conservation of energy and angular momentum. A model is proposed for modifying ion molecule reaction theory to account for the phenomenon in HD(+) where the center-of-mass is not at the center of the bond and the diatomic possesses a rotation about the center-of-mass. This

modification produces an energy dependent isotope effect which correlates well with the experimental data. The charge transfer reaction X + HD(+) yields X(+) + HD was also observed in the Ar and Kr studies. The results are compatible with Massey's 'adiabatic' hypothesis. (Author)

AD-618 552 Div. 4/2
CFSTI Prices: HC$3.00 MF$0.75

Ohio State Univ., Columbus.
THE ENRICHMENT AND DETERMINATION OF TRITIUM IN WATER.
Master's thesis,
by Ralph William Burns, Jr. 1965, 85p
Unclassified report

Descriptors: (*Tritium, Chemical analysis), (*Water, Tritium), Heavy water, Purification, Spectroscopy, Scintillation counters, Adsorption, Clay minerals, Chromatographic analysis, Ion exchange resins, Ammonium compounds, Molybdates, Phosphates.

The various methods that have been used for the enrichment of tritium are reviewed. The developments in liquid scintillation spectrometry are presented. In addition, the other methods that are used for the determination of tritium are reviewed and compared with liquid scintillation spectrometry. In an attempt to find a more sensitive and a more convenient method for the determination of tritium in large volumes of water, the preferential adsorption of tritiated water by various materials is investigated. (Author)

AD-618 638 Div. 4/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF RADIOACTIVE RADIATION OF 35S and 99Mo ON SPECIFIC SURFACE VALUE OF MOLYBDENUM DISULFIDE,
by V. I. Spitsyn, I. E. Zimakov, and N. P. Dobroselskaya.
12 May 65, 8p Rept. no. FTD-TT-65-26
TT 65-62702
Unclassified report

Unedited rough draft trans. of Radiokhimiya (USSR) v6 n1 p130-2 1964.

Descriptors: (*Molybdenum compounds, Sulfides), (*Sulfides, Radiation damage), (*Radiation damage, Sulfides), Surface properties, Isotopes, USSR.

Compounds of MoS2 that were obtained from melt and containing various amounts of radioactive isotope Mo99 and S35 were synthesized. The magnitude of specific surface of radioactive MoS2 samples differs noticeably from nonradioactive, increasing in proportion to the growth of specific radioactivity. For compounds with S35, the surface increases smoothly with increase in specific radioactivity, attaining about a 3-fold increase at a 30-microcurie/g radioactivity level; introduction of Mo99 led to a much sharper rise. At a specific radioactivity of 5 microcuries/g, the value of the Mo*S2 surface constitutes 18.83 sq m/g and MoS*2 equals 10.16 sq m/g. The energy of beta radiation of the isotope introduced affected the magnitude of specific surface of the solid compounds formed. The radioactive radiation was regarded as exerting an effect on the magnitude of specific surface of radioactive compounds only in the process of formation of the MoS2 crystals.

08. Earth Sciences and Oceanography

AD-617 922 Div. 2/8, 25/3
CFSTI Prices: HC$2.00 MF$0.50

Innsbruck Univ. (Austria).
DETERMINATION OF ROCK CONDUCTIVITY IN A MINE GALLERY. SOLUTION OF THE RESPECTIVE BOUNDARY PROBLEM.
Interim scientific rept.,
by G. Tinhofer. 1 Apr 65, 30p
Rept. no. SR-13
Contract AF61 052 490
AFCRL 65-430

Unclassified report

Rept. on Propagation of VLF Waves.

Descriptors: (*Electrical conductance, Rock(Geology)), (*Rock(Geology), Electrical conductance), Electric currents, Electrodes, Cylindrical bodies, Potential theory, Boundary valve problems, Geophysics.

Conductivity determination of natural rock below ground requires the solution of the boundary problem for the potential of two electrodes on a hollow cylinder surface. An asymptotic representation is given for this potential. The current flow through the z-0 plane is calculated. (Author)

AD-617 955 Div. 2/2, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Laboratory for Electroscience Research, New York Univ., N. Y.
COMPUTER STORAGE AND ANALYSIS OF CONTOUR MAP DATA.
Technical rept.,
by S. P. Morse. Feb 65, 69p Rept. no. TR-400-106
Grant AF AFOSR6524, Proj. 9769, Task 976902
AFOSR 65-0592

Unclassified report

Descriptors: (*Mapping, Digital computers), (*Digital computers, Mapping), (*Compilers, Mapping), Maps, Curved profiles, Geometric forms, Terrain, Data processing systems, Numerical methods + procedures, Computer logic, Data storage systems.

This report describes a method for storing and analyzing contour map data in a digital computer. The data is stored in the so-called contour-line-storage form. This form represents the contour lines in terms of sequences of octally encoded, short, straight-line segments. Algorithms can be developed to analyze the data directly in this form. In some cases, however, it may be advantageous first to convert the data into a form more suitable for the particular analysis. In this report, algorithms are described for locating the ground profile of a given path on a map, generating the gradient at a point on the map, and finding the volume between two elevations. As an illustration, some of the algorithms are applied to the problem of locating the ground track of an aircraft from the pilot's record of heading and altitude vs. time. This problem envolves selecting certain ground tracks as 'likely candidates,' generating the ground profile for each of these tracks, comparing these ground profiles with the pilot's record of altitude vs. time, and then selecting the candidate that most closely agrees with the pilot's record. (Author)

AD-617 969 Div. 2/5, 9/4

Arctic Inst. of North America, Montreal (Quebec).
HYDRODYNAMIC ANALYSIS OF CIRCULATION AND ORIENTATION OF LAKES IN NORTHERN ALASKA,
by R. W. Rex. 1961, 24p

Unclassified report

Research supported in part by Office of Naval Research, Washington, D. C.
Pub. in mono. Geology of the Arctic, Toronto, 1961 p1021-43 (Copies available only to DDC users).

Descriptors: (*Lakes, Alaska), (*Hydrodynamics, Lakes), Hydrology, Wind, Lake waves, Marine geophysics, Graphics.

The systematic orientation of elliptical lakes occurring in the unconsolidated sediments of the Arctic Coastal Plain of Alaska has been attributed by some investigators to winds blowing along their major axes (Black and Barksdale, 1948) and by others to winds blowing along their minor axes (Livingston, 1954; Mackey, 1956a, b, 1957, 1958; Zenkovitch, 1959). The application of hydrodynamic principles resolves this question in favour of orientation of the lake minor axis parallel to the dominant wind direction. Details of predicting lake waves and computing longshore currents, orbital velocities associated with shoaling waves, orbital velocities required to move sediments, and equilibrium shoreline configurations are presented with an example for the Barrow area of Alaska. Data are provided so that the reader may repeat these computations for other cases. Although the area studied here is in the Arctic, the same hydrodynamic principles apply to oriented lakes, bays, and lagoons elsewhere in the world. One may reverse this line of reasoning and utilize geomorphological evidence to make meteorological deductions. The details of Black and Barksdale's (1948) descriptions of the Alaskan lakes suggest that the summer intensity of the polar northeasterly winds is decreasing and that there has been a recent increase of southerly winds. (Author)

AD-618 017 Div. 2/10
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
A COMPARISON OF SEISMIC ARRAY PROCESSING SCHEMES.
Technical note,
by E. J. Kelly, Jr. 14 Jun 65, 21p
Rept. no. TN-1965-21
Contract AF19 628 500, ARPA Order 512
ESD TDR-65-234

Unclassified report

Descriptors: (*Seismology, Data processing systems), (*Data processing systems, Seismology), Seismographs, Signal-to-noise ratio, Statistical analysis.

It is the purpose in this note to discuss three of the many approaches to seismic array processing from the theoretical point of view. The three are: (1) maximum-likelihood processing, (2) the minimum-variance, unbiased estimator (MVU) approach used by Levin, and (3) multichannel Wiener filtering. A feature common to these techniques is the formation of a single output waveform which serves as an estimator of the unknown signal coming from a fixed direction. We refer to such an output as a 'beam'. It will be shown that (1) reduces to (2) in the case of gaussian noise and known signal parameters (i.e., known epicenter) and that (3) is related very simply to (2). In fact, the Wiener filtering output can be obtained directly from the MVU output. Both the sampled-data and continuous-time cases are treated. The note contains no new results. (Author)

AD-618 039 Div. 2/9
CFSTI Prices: HC$1.00 MF$0.50

Woods Hole Oceanographic Institution, Mass.
THE HYDROGRAPHY AND SEDIMENTS OF THE GULF OF DARIEN.
Technical rept.,
by John M. Zeigler and William D. Athearn. Jun 65, 25p Rept. nos. 1676, ref-65-29
Contract Nonr219600, Proj. NR083 004

Unclassified report

Descriptors: (*Gulfs, Colombia), (*Inland waterways, Feasibility studies), (*Hydrographic surveying, Colombia), (*Estuaries, Colombia), Oceanology, South America, Rivers, Sedimentation, Oceanographic data.

Circulation in the Gulf of Darien at the juncture of Central America and South America is that of a typical estuary; fresh water flowing seaward over salt water which is moving landward. Details of the circulation seem to be complex, with faster flowing currents adjacent to the eastern coast; but variations in climate probably cause current distribution to change from season to season. Inasmuch as the Atrato River has been mentioned as a possible site for a new canal between the Atlantic and Pacific Oceans, it is of great interest that sedimentation seems to be much greater off the mouths of the southern distributaries than off the mouth of the northern channel at Playa Tarena. This indicates that the northern distributary may be easier to maintain as a canal. (Author)

AD-618 053 Div. 2/9, 9/1
CFSTI Prices: HC$3.00 MF$0.75

Chicago Univ., Ill. Fluid Dynamics and Sediment Transport Lab.
SOME EFFECTS OF PARTICLE-BED GEOMETRY IN SELECTIVE SEDIMENT SORTING.
Technical rept.,
by R. J. Byrne. Feb 65, 79p Rept. no. TR-3
Contract Nonr212126

Unclassified report

Supported in part by National Science Foundation.

Descriptors: (*Sedimentation, Experimental data), (*Fluid dynamic properties, Sedimentation), Transport properties, Wind tunnels, Shear stresses, Velocity, Geometry, Least squares methods.

In an effort to better understand the initial phases of sediment sorting, the resistance to movement due to particle-bed geometry was studied in a wind tunnel. In order to reduce the complexity encountered in the natural situation a simplified experimental design using spherical particle size, particle density and the size of bed roughness. Initial motion of the test particles was directly observed and correlated with the corresponding average surface shearing stress acting on the bed. A re-evaluation of published data of wind flow over sand surfaces indicates that the surface roughness effects are not fully developed at the inception of particle transport of fine and medium sands. For the range of variables studied, the threshold shear velocity was found to be a function of the particle's fall velocity, the relative density and the ratio of particle exposure to the viscous sub-layer thickness. The experimental data indicate that spheres of different density but equal in diameter and resting on spheres of uniform size, have a threshold equivalent equal to the ratio of their fall velocities. (Author)

AD-618 063 Div. 2/4, 19/3, 8/3
CFSTI Prices: HC$6.00 MF$1.25

Cubic Corp., San Diego, Calif.
SHIRAN: GEODETIC SURVEY SYSTEM, ELECTRONIC AN/USQ-32(XA-1).
Rept. for 28 Feb 62-Oct 64.
Apr 65, 208p Rept. no. FTR/21-2
Contract AF33 657 7546, Proj. 7650
SEG TR-64-72

Unclassified report

Descriptors: (*Geodesics, Distance-measuring equipment), (*Distance-measuring equipment, Geodesics), (*Surveying, Electronic equipment), (*Radio equipment, Distance-measuring equipment), Airborne, Transponders, Radio transmitters, S band, Phase modulation, Phase measurement, Magnetic recording systems, Range finding, Data processing systems, Photogrammetry, Ground support equipment, Systems engineering.

SHIRAN is composed of an airborne Distance Measuring Interrogator Set AN/APQ-105(XA-1) and four or more ground-based Distance Measuring Transponder Sets AN/TPQ-24(XA-1). The airborne interrogator ranges simultaneously to up to four ground transponders and records time-indexed range data on magnetic tape in conventional computer format. Maximum slant range to any one transponder is 500 nautical miles, with line crossing accuracies in the order of ±10 feet (PE). Ranging operation may be synchronized with photomapping camera shutters for controlled photography missions. This report fully describes the system and the equipment that was developed. The operation of the equipment is explained at the block diagram level. Also described are the rf equipment items especially designed for SHIRAN under subcontract, and the modifications made to SHIRAN equipment to enable its use in the AN/USQ-28 program. The extensive flight tests and comprehensive environmental tests conducted on the developmental equipment are covered in detail. Test results confirmed that all design goals were met.

AD-618 069 Div. 2/5, 13/4, 30/3
CFSTI Prices: HC$2.00 MF$0.50

New Mexico Univ., Albuquerque. Air Force Shock Tube Facility.
A STUDY OF PARAMETERS AND METHODS INVOLVED IN RELATIVE DISPLACEMENT MEASUREMENTS IN SOIL.
Final technical rept. for Jan-Nov 64,
by Warren J. Baker and Robert E. Lynch.
Jun 65, 41p
Contract AF29 601 6002, Proj. 5710, Tasks G4N, DASA13502
WL TR-65-75

Unclassified report

Descriptors: (*Soil mechanics, Transducers), (*Transducers, Soil mechanics), Underground structures, Soils, Stresses, Strain(Mechanics), Deformation, Measurement, Meters, Engineering geology, Test methods, Statics, Strain gages.

A study of the parameters and methods involved in relative displacement measurements in soil was conducted. Static tests were performed to assess the influence and corrective measures necessary to eliminate the erroneous effects of arching, overstress, and lateral deformations of the coupling shaft found in spool gage displacement measurements. Stress wave reflections and gage lengths are discussed with reference to dynamic data collected in dry sand several months prior to this study. The study resulted in the formulation of a set of minimum criteria

to be used when the spool gage concept is employed to measure relative displacements in soil. These criteria were applied to the design of a spool gage which was tested and compared with the performance of a magnetic coil displacement gage that is relatively free from mechanical mismatch effects. The results from the two gages tested in a controlled environment were very similar. (Author)

AD-618 089 Div. 2/9
CFSTI Prices: HC$2.00 MF$0.50

Woods Hole Oceanographic Institution, Mass.
SEDIMENT CORES FROM THE CARIACO TRENCH, VENEZUELA,
by William D. Athearn. Jul 65, 39p Reference no. 65-37
Contract Nonr219600, Proj. NR083 004

Unclassified report

Descriptors: (*Caribbean Sea, Ocean bottom sampling), (*Ocean bottom sampling, Caribbean Sea), Venezuela, Seacoast, Well logging, Stratigraphy, Sedimentation, Petrology, Paleontology, Oceanology.

The Cariaco Trench, located within the limits of the continental shelf off the Caribbean coast of Venezuela, is about 160 kilometers long, 40 kilometers wide, and lies 16 to 32 kilometers offshore. Sill depth is about 150 meters; maximum depth in the trench is about 1400 meters. Within the trench, waters deeper than 375 meters are anoxic. During cruises in 1957 and 1958, R/V ATLANTIS collected over twenty sediment cores, mostly piston type of 3 to 10 meters length, from the trench and its vicinity. The Holocene sediments from the euxinic zone of the trench are mostly grayish-olive and fine-grained; either laminated silt-clays or homogeneous silty clays, both types generally containing a paucity of benthic fauna. A lower zone of sediments, at least on the south slopes, consists of yellowish-brown silty clays containing a fair representation of benthic fauna. These appear to have been deposited under normal marine conditions before the basin waters became anoxic and are considered to be late Pleistocene in age. Greatest accumulations of sediments and highest organic contents are believed to occur in the eastern and northeastern parts of the trench. (Author)

AD-618 136 Div. 2/9
CFSTI Prices: HC$3.00 MF$0.75

Naval Postgraduate School, Monterey, Calif.
PALEO-OCEANOGRAPHY OF THE MEDITERRANEAN SEA: SOME CONSEQUENCES OF THE WURM GLACIATION,
Master's thesis,
by Richard S. Anderson, Jr. 1965, 82p

Unclassified report

Descriptors: (*Mediterranean Sea, Oceanology), (*Oceanology, Mediterranean Sea), (*Glaciers, Oceanology), Geography, Climatology, Hydrology, Marine geology, Paleontology.

The lowering of sea level and altered climatic conditions associated with the Wurm Glaciation are examined with a view toward determining their effect on the oceanography of the Mediterranean Sea. Assuming tectonic and other geological alterations to have been negligible, a eustatic sea-level lowering of 450 feet (136 meters) is assumed, and the Wurm coastlines of the principal straits and seas are drawn from navigational charts. The effect of the lower sea level on the areas and volumes of the major channels and basins is determined. A quantitative evaluation of the Wurm water budget for the Mediterranean Sea is made, and on the basis of this determination, some general conclusions concerning water-mass characteristics and circulations are hypothesized. The water budget is found to have been in a more delicate state of balance during Wurm time than at present, whereas the quantity of water exchanged through the Strait of Gibraltar was not drastically altered. Methods of study such as this might prove useful in correlating and substantiating presently existing hypotheses in paleoclimatology, Quaternary geology, paleontology, and paleo-oceanography. (Author)

AD-618 156 Div. 2/5

National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
RESISTANCE OF SOIL STRUCTURE TO CONSOLIDATION,
Research paper,
by C. B. Crawford. 1965, 30p Rept. nos. RP-247, NRC-8504

Unclassified report

Pub. in Canadian Geotechnical Journal v2 n2 p90-115 May 1965 (Copies available only to DDC users).

Descriptors: (*Soil mechanics, Compressive properties), Soils, Loading(Mechanics), Clay, Permeability, Crystallography.

The rate at which soil specimens are compressed in the standard consolidation test is farther from reality than the rate of strain in any other test. For a short period after the application of a load increment the rate of compression may be several million times faster than that experienced in the field. This paper describes a series of tests carried out at constant rates of compression varying from 0.16 to 8 per cent per hour in which pore pressures were measured. The effective stress-compression curves are compared with an average curve obtained by incremental loading. Based on these results, it is concluded that the compressibility of this soil is dependent on the average rate of compression and that the soil structure has a substantial time-dependent resistance to compression. This time-dependent resistance may be expected to have a significant influence on computed permeability coefficients and field rates of consolidation. (Author)

AD-618 168 Div. 2/4, 2/3

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Physics.
AN EXPERIMENT ON PHOTOGRAMMETRIC CONTOURING OF VERY FLAT AND FEATURELESS TERRAIN,
by T. J. Blachut. 1965, 13p Rept. no. NRC-7998

Unclassified report

Pub. in Nachrichten aus dem Karten- und Vermessungswesen v5 n9 (Sonderhefte) p71-83 1965.
(Copies available only to DDC users).

Descriptors: (*Photogrammetry, Mapping), (*Mapping, Photogrammetry), Terrain, Configuration, Stereoscopic map plotters, Geodesics.

AD-618 209 Div. 2/10, 30/2, 32/3
CFSTI Prices: HC$3.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
SAMPLING EVENTS FROM U.S.C. AND G.S. EARTHQUAKE CARDS,
Scientific rept. no. 11 (Final) for 1 Apr-15 Jun 65,
by Stephen M. Simpson, Jr., Ralph A. Wiggins, and Cheh Pan. 30 Jun 65, 77p
Contract AF19 604 7378, Projs. 8652, ARPA Order 180 61,

Task 865203
AFCRL 65-463

Unclassified report

Rept. on Proj. VELA UNIFORM.

Descriptors: (*Earthquakes, Information retrieval), (*Information retrieval, Earthquakes), (*Seismology, Information retrieval), (*Data processing systems, Seismology), Geophysics, Programming(Computers), Data storage systems, Magnetic tape, Search theory, Sampling.

Two computer programs are presented and illustrated for statistical selection of events from magnetic tapes containing images of U. S. Coast and Geodetic Survey Earthquake Cards. The first program produces an output tape containing cards for all events within a given time range, depth range, and geographical area. The area is specified by arbitrary sets of trapezoids whose parallel sides are latitude lines. Three major seismic regionalizations (Gutenberg and Richter's, Schaeffner's and Texas Instruments') have been card coded into such sets. The second program selects, from the output tape of the first program, all events in given magnitude ranges. It then shuffles the events using the Rand random digits and deals out a selected number of them. (Author)

AD-618 295 Div. 2/9
CFSTI Prices: HC$2.00 MF$0.50

Lehigh Univ., Bethlehem, Pa. Marine Science Center.
MINERAL PARTICLES SUSPENDED IN SURFACE SEAWATER.
Preliminary rept.,
by Keith E. Chave. Jul 65, 43p
Contract Nonr61007; Grant GP3505

Unclassified report

Descriptors: (*Sea water, Minerals), (*Minerals, Sea water), Colloids, Particles, Particle size, Calcium compounds, Carbonates, Organic coatings, Surfaces, Quartz, Sedimentation.

Mineral particles suspended in surface seawater in tropical and subtropical regions are composed primarily of carbonates and quartz. The particles, which are in the size range 10-50 microns, can be present in concentrations at least as high as 5 mg per liter. Organic coatings on the mineral grains prevent free interaction between the seawater and the particles; thus they do not act as nuclei for precipitation from supersaturated seawater or are they readily dissolved by undersaturated seawater. Suspended mineral particles appear to be derived from shallow water bottom sediments and from river detritus. (Author)

AD-618 400 Div. 2/10, 10/2
CFSTI Prices: HC$3.00 MF$0.75

Shell Development Co., Houston, Tex.
SEISMIC NOISE IN DEEP BOREHOLES.
Final rept. for Mar 63-Feb 65,
by Aaron J. Seriff, Joseph H. Rosenbaum, Cornelius J. Velzeboer, and Richard J. Hasse. 21 Jun 65, 94p
Contract AF19 628 2785, Projs. 8652, ARPA Order 292, Task 865204
AFCRL 65-490

Unclassified report

Rept. on Proj. VELA-UNIFORM.

Descriptors: (*Seismology, Scientific research), (*Noise, Seismology), (*Well logging, Seismic waves), Instrumentation, Theory, Seismographs, Seismological stations, Extemely low frequency, Texas, North Dakota.

Seismic noise in the frequency range 0.2 to 5.0 cps was observed in three wells approximately 10,000 feet deep. The wells are in the Texas Gulf Coast, the Val Verde Basin of West Texas and the Williston Basin of North Dakota. Observations were made at 1000 foot intervals in each well and simultaneous observations were made in a 500 foot reference hole and at four surface stations approximately 1500 feet apart. These seismometers were vertical component Benioffs. Two surface horizontal components were also recorded. Power spectral ratio, coherence and cross correlation phase were computed for most seismometer paris, particularly the deep well seismometer and the 500 foot reference. The theoretical response of appropriate plane layered elastic models to trapped Rayleigh and Love waves as well as to plane P, SV, and SH waves incident from below was investigated in detail over the applicable frequency range for each of the three sites. Two essentially independent models for the noise have been investigated. One is based on the assumption that at a given frequency the average energy density is the same for each trapped surface mode (Rayleigh and Love) and that the modes are independent; the other assumes that at a given frequency independent plane P, SV, and SH waves with equal energy flux in all directions are incident from the lower half space.

AD-618 407 Div. 2/9, 16/4
CFSTI Prices: HC$4.00 MF$1.00

Washington Univ., Seattle.
PHYTOPLANKTON DATA FROM THE CHUKCHI SEA, 1959-1962.
Technical rept.,
by William A. Dawson. Mar 65, 128p
Rept. nos. TR-117, Reference M65-7
Contracts Nonr47710, Nonr47737
Projs. NR083 012; RR004 03 01

Unclassified report

Descriptors: (*Plankton, Chukchi Sea), (*Chukchi Sea, Plankton), (*Oceanographic data, Chukchi Sea), Marine biology, Temperature, Salinity, Solar radiation, Distribution, Plants(Biology), Pigments, Chlorophylls, Diurnal variation, Sampling, Maps, Tables, Oceanographic vessels.

The report contains tabulations of the measurements of phytoplankton standing crops by plant pigment analysis, and measurements of primary productivity carried out on five cruises to the Chukchi Sea, together with corresponding measurements of temperature, salinity and incident solar radiation. Over-all aspects of the distribution and abundance of phytoplankton in the Chukchi Sea are discussed. (Author)

AD-618 425 Div. 2/10

Mackay School of Mines, Univ. of Nevada, Reno.
THE P sub g-P sub n METHOD OF DETERMINING DEPTH OF FOCUS WITH APPLICATIONS TO NEVADA EARTHQUAKES,
by Roger W. Greensfelder. 11 Nov 64, 13p
Grant AF AFOSR646 64

Unclassified report

Pub. in Bulletin of the Seismological Society of America v55 n2 p391-403 Apr 1965 (Copies not available to DDC or Clearinghouse customers)

Descriptors: (*Earthquakes, Numerical analysis),

Nevada, Seismology, Tables, Measurement, Equations, Underground explosions, Detection, Nuclear explosions.

The P sub g-P sub n method is theoretically developed, including a complete error analysis, and then applied to some Nevada earthquakes. It is found that, as expected, the method is very sensitive to the crustal model used, and the appearance of large errors in depths of focus calculated for some earthquakes leads to the conclusion of a major discontinuity in crustal thickness (ca. 10 km) north and east of Walker Lake, Nevada. This discontinuity may have its surface expression in the Walker Lane, a major right-lateral shear zone which has been defined on both physiographic and geologic grounds. (Author)

AD-618 430 Div. 2/10

Mackay School of Mines, Univ. of Nevada, Reno.
CATALOG OF NEVADA EARTHQUAKES, 1852-1960,
by David B. Slemmons, Austin E. Jones, and James I. Gimlett. 18 Dec 64, 48p
Grant AF AFOSR62 285

Unclassified report

Research done in cooperation with Hycon Mfg. Co., Monrovia, Calif.
Pub. in Bulletin of the Seismological Society of America v55 n2 p519-65 Apr 65 (Copies not available to DDC or Clearinghouse customers).
Rept. on Proj. Vela Uniform

Descriptors: (*Earthquakes, Nevada), Catalogs, Seismology, Seismological stations, Faults(Geology).

Nevada earthquakes for the period from about 1852 to 1961 are tabulated on I.B.M. punch cards. During this period 1,173 events with Nevada epicenters were felt, 586 others with Richter magnitudes above 4.0 were recorded and were probably felt by some residents, and approximately 220 were reported in non-specific terms (e.g. 'several aftershocks were felt'). High seismicity of this region is indicated by the fact that on an equal-area basis, during the period 1934-1960, Nevada has had the highest incidence of earthquakes per unit area of any of the conterminous Western States. The seismic activity shows a distinct tendency, statistically inadequate, for a 20-year cycle of activity, with peaks at about 1852, 1872, 1894, 1916, 1932-33, and 1954. The general increase in number of events reported each year correlates well with the increase in Nevada population, but is probably modified by the development of: increasingly sophisticated methods of recording, spacing of seismographic stations, more intensive earthquake investigations of the United States Coast and Geodetic Survey, and changing population density and distribution. A method is developed for correlating between Richter magnitude, earthquake intensity, and size of felt area. This permits estimation of earthquake magnitude for shocks that pre-date instrumental methods of recording.

AD-618 465 Div. 2/6, 12/1, 22/11
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
ON THE MEASUREMENT OF THE X-, Y-, AND Z-COMPONENTS OF THE GEOMAGNETIC FIELD ON SATELLITES AND ROCKETS.
26 Jul 65, 11p Rept. no. ATD-T-65-55
TT 65-62672

Unclassified report

Trans. of Kosmicheskie Issledovaniya (USSR) v3 n2 p231-6 1965. Rept. on Surveys of Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Terrestrial magnetism, Measurement), (*Satellites(Artificial), Terrestrial magnetism), (*Rockets, Terrestrial magnetism), Field theory, Perturbation theory, Magnetometers, USSR.

An investigation is made of the feasibility of measuring the X-, Y-, and Z-components of the geomegnetic field on satellites tri-axially oriented relative to the center of the earth, and on unoriented objects. (Author)

AD-618 475 Div. 2/9, 30/2
CFSTI Prices: HC$1.00 MF$0.50

Texas A and M Univ., College Station. Dept. of Oceanography and Meteorology.
AUTOMATED ACQUISITION AND HANDLING OF SERIAL OCEANOGRAPHIC DATA,
by Roy D. Gaul and Alfred Kirst, Jr. 15 May 65, 17p Reference R-65-16T
Contract Nonr21194, Projs. NR083 036, 286D

Unclassified report

Descriptors: (*Oceanographic data, Data processing systems), (*Data processing systems, Oceanographic data), Data storage systems, Oceanographic equipment, Transducers, Telemeter systems, Commutators, Automatic, Systems engineering, Data, Florida.

An approach to acquisition and handling of air-sea environmental data is demonstrated by a specific system currently in use. Key functional features of automated data handling are discussed in terms of design alternatives available at various points in the information chain. Emphasis is placed on the need for giving special attention to conditions under which data are collected and for preserving the original form of the data. (Author)

AD-618 485 Div. 2/10, 25/1
CFSTI Prices: HC$3.00 MF$0.75

Woods Hole Oceanographic Institution, Mass.
OCEANOGRAPHIC AND UNDERWATER ACOUSTICS RESEARCH.
Progress rept. for 1 May-31 Oct 64.
Mar 65, 80p Reference no. 65-12
Contracts Nonr402900, Nonr324300,
Projs. NR260 101, NR260 108

Unclassified report

Descriptors: (*Underwater sound, Scientific research), (*Oceanology, Scientific research), Marine geophysics, Hydrographic surveying, Underwater sound equipment, Sound transmission, Ocean bottom topography, Echo ranging, Hydrophones, Ocean bottom sampling, Rock-(Geology), Bathythermograph data, Heat transfer, Ocean currents, Underwater photography, Indian Ocean, Atlantic Ocean, Red Sea, Mediterranean Sea, Seismology.

Geophysical investigations were carried out aboard R/V CHAIN in the Indian Ocean, the Mediterranean Sea, and the North Atlantic Ocean. Observations underway were continuous seismic profiling, gravity, magnetic, and echo sounding measurements. At stations rocks were dredged, cores were taken (about 10 meters long, photographic montages of the sea floor were made, and the sound velocity of the water was measured as a function of depth. Progress is being made in filtering and correlation techniques for seismic profiling, while seismic receiving arrays were improved to make them quieter. The analysis of internal wave data is continuing, but further observations at sea will be required in order to fully understand the mechanism of propagation. A new thermistor string intended to replace and improve upon the original thermistor chain was the principal new instrumental development.

AD-618 562 Div. 2/5, 2/7
CFSTI Prices: HC$1.00 MF$0.50

Uppsala Univ. (Sweden).
GEOPHYSICAL ASPECTS OF COSMIC RAYS.
Final rept.,
by A. E. Sandstrom. 15 Apr 65, 22p
Grant AF EOAR64 64
AFCRL 65-418
Unclassified report

Continuation of Contracts AF61 514 1312, AF61 052 614.

Descriptors: (*Geophysics, Cosmic rays), (*Cosmic rays, Geophysics), Nucleons, Mesons, Atmospherics, Diurnal variation, Solar radiation, Solar flares, Radiation monitors, Scintillation counters, Sweden.

AD-618 576 Div. 2/6, 2/1

Defence Research Northern Lab., Fort Churchill (Manitoba).
A SIMPLE METHOD FOR DETERMINING THE LOCAL TIME OF GEOMAGNETIC MIDNIGHT,
by L. E. Montbriand. 18 Mar 65, 7p
Unclassified report

Pub. in Canadian Journal of Physics v43 p1074-7 Jan 1965 (Copies available only to DDC users).

Descriptors: (*Terrestrial magnetism, Time), (*Time, Determination), Geodesics, Geography.

A discussion on geomagnetic time is given together with a new method of calculating the local time of geomagnetic midnight quickly and easily. Although this method is new, the ideas behind it are merely a simplification of a method set forth in a paper by A. G. McNish. (Author)

AD-618 599 Div. 2/9, 2/5

Marine Lab., Univ. of Miami, Coral Gables, Fla.
REMARKS ON AGE DETERMINATION IN DEEP-SEA SEDIMENTS,
by F. F. Koczy. 1963, 16p
Contracts Nonr400802, AT40 1 2411
Unclassified report

Pub. in Progress in Oceanography v3 p155-71 1965 (Copies available only to DDC users).

Descriptors: (*Marine geology, Sedimentation), (*Sedimentation, Geologic age determination), (*Geologic age determination, Sedimentation), Determination, Oceanology, Ocean bottom sampling, Chemical analysis, Thorium, Uranium, Sea water.

The general problem of age determination in ocean sediments is reviewed with special regard to geochemical processes in the ocean. Specifically, the equilibrium condition for chemisorption on sediment particles is discussed under the assumption that the equilibrium constant does not change between sediment and sea water, i.e. between systems of extremely high and low sediment concentration. Included is the problem of the geochemical changes of the speciation of adsorbed nuclides with reference to the solubility of the nuclides in acid solutions. The validity of one of the generally used methods for age determination which is based on the assumption of a constant concentration in sea water over geological time is investigated. It is demonstrated that the uranium/thorium ratio in sea water may change with time. Consideration is given to the conditions under which the ionium/thorium ratio may be utilized for determination of age and, consequently, for the determination of the rate of sedimentation. (Author)

AD-618 604 Div. 2/5

Arctic Inst. of North America, Washington, D. C.
CONCERNING GENESIS OF THE BURIED ORGANIC MATTER IN TUNDRA SOIL.
Technical rept.,
by John C. F. Tedrow. Apr 64, 3p
Rept. no. ONR-328(2)
Contract Nonr399601, Proj. NR307 105
Unclassified report

Prepared in cooperation with Rutgers - The State Univ., New Brunswick.
Pub. in Soil Science Society of America Proceedings v29 n1 p89-90 Jan-Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Arctic regions, Soils), (*Soils, Organic compounds), Alaska, Plants(Botany), Stratigraphy, Permafrost.

Ever since the presence of a deep zone of concentrated organic matter was first reported in arctic Tundra soils of northern Alaska, there have been a number of questions relative to the origin of the organic material. It is well known that frost action in arctic Tundra soils results in physical displacement of organic matter to considerable depth within the regolith. Field observations clearly show that the deep organic concentration is confined to Tundra soil, and it is strongly suggested that the deep organic horizon in Tundra soil of Northern Alaska is a result of a cryopedogenic process. If the zone of deep organic matter concentration were a result of geologic accident in all probability organic matter would not be coincident with the Tundra-Arctic Brown soil boundary. (Author)

AD-618 605 Div. 2/5

Arctic Inst. of North America, Washington, D. C.
SOME QUATERNARY EVENTS OF NORTHERN ALASKA.
Technical rept.,
by John C. F. Tedrow and Grant F. Walton. Sep 64, 5p Rept. no. ONR-328(1)
Contract Nonr399601, Proj. NR307 105
Unclassified report

Prepared in cooperation with Rutgers - The State Univ., New Brunswick.
Pub. in Arctic, Journal of the Arctic Institute of North America v17 n4 p268-71 Dec 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Alaska, Geology), (*Glaciers, Geology), (*Geology, Glaciers), Soils, Geologic age determination, Geological survey, Stratigraphy.

Discovery of an organic deposit in 1963 necessitates reexamination of the glacial chronology and some comments on the present and past climate of the upper Killik River area. The studies reported here were carried out where the Killik River flows northward from the Brooks Range through the southern foothills. The valley is 2 to 5 miles wide and has terrace remnants 70 to 100 ft. high. Field observations indicate that most of the valley floor was once covered with glacio-fluvial deposits, most of which were subsequently eroded away.

AD-618 609 Div. 2/10

Acoustics and Seismics Lab., Univ. of Michigan, Ann Arbor.
VARIATIONS IN COMPRESSIONAL WAVES AT TELESEISMIC DISTANCES.
Revised ed.,

by David E. Willis. 11 Feb 65, 7p
Contract AF49 638 1170

Unclassified report

Pub. in Journal of Geophysical Research v70 n8 p1877-83 Apr 15 1965. (Copies not available to DDC or Clearinghouse customers).
Revision of Manuscript submitted 27 Oct 64.

Descriptors: (*Underground explosions, Seismic waves), (*Seismic waves, Underground explosions), Nuclear explosions, Seismographs, Frequency.

Short-period seismic waves from three underground explosions at the Nevada test site were recorded at comparable distances by University of Michigan field crews located at various sites between Minnesota and Georgia. The signal levels measured on the seismograms showed that the apparent ground displacement decreased gradually toward the south and that the difference in signal level for any one shot varied by nearly a factor of 4. However, spectral analyses of these recordings disclosed that for frequencies between 0.4 to 0.63 cps, these signal levels were nearly equal. There appears to be a regional effect which indicates greater absorption of energy between 0.8 and 2 cps toward the southern recording stations. Recordings obtained in areas of thick sedimentary sections showed greater complexity in the compressional wave train than recordings in areas of thin sedimentary sections. (Author)

AD-618 610 Div. 2/10, 25/4

Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
TIME-VARYING SPECTRA THROUGH OPTICAL DIFFRACTION SCANNING,
by Philip L. Jackson. 1 Nov 63, 17p
Contract AF49 638 1078

Unclassified report

Pub. in Bulletin of the Seismological Society of America v54 n2 p485-500 Apr 1964 (Copies not available to DDC or Clearinghouse customers).
See also AD-419 191.

Descriptors: (*Seismographs, Optical scanning), (*Optical scanning, Diffraction), Seismology, Frequency, Time, Optical equipment, Measurement, Data processing systems, Integral transforms, Band-pass filters.

An optical scanning method has been developed to present frequency content as it occurs and changes throughout a variable-density seismogram. Energy distributions are shown in both frequency and time. A two-dimensional pattern is presented which can be visually evaluated, and is suitable for numerical measurement. Seismic wave dispersions can be revealed and measured through a similar scanning method. (Author)

AD-618 611 Div. 2/10, 2/2

Instituto Geografico y Catastral, Madrid (Spain).
A SEISMIC PROBABILITY MAP,
by J. M. Munuera. 3 Oct 64, 15p
Contract AF61 052 657

Unclassified report

Pub. in Annali di Geofisica v17 n4 p548-61 1964 (Copies available only to DDC users).
Rept. on Proj. VELA-UNIFORM.

Descriptors: (*Seismic waves, Maps), (*Maps, Seismic waves), (*Probability, Earthquakes), Spain, Seismology, Mathematical prediction.

The material included in two former papers which sums 3307 shocks corresponding to 2360 years, up to 1960, was reduced to a 50 years period by means the weight obtained for each epoch. The weighting factor is the ratio 50 and the amount of years for every epoch. The frequency was referred over basis VII of the international seismic scale of intensity, for all cases in which the earthquakes are equal or greater than VI and up to IX. The sum of products: frequency and parameters previously exposed, is the probable frequency expected for the 50 years period. On each active small square, the corresponding computation was made and the Map No 1 drawn, in percentage. The epicenters with intensity since X to XI are plotted in the Map No 2, to present complementary information. A table shows the return periods obtained for all data (VII to XI), and after checking them with other computed from the first up to last shock, a list includes the probable approximate return periods estimated for the area. The solution is an appropriated form to express the seismic contingent phenomenon and it improves the conventional maps showing the equal intensity curves corresponding to the maximal values of given side. (Author)

AD-618 623 Div. 2/10, 15/1

Institute of Geophysics and Planetary Physics, Univ. of California, San Diego.
EARTH NOISE, 5 TO 500 MILLICYCLES PER SECOND. I. SPECTRAL STATIONARITY, NORMALITY, AND NONLINEARITY.
Revised ed.,
by Richard A. Haubrich. 8 Dec 64, 13p
Grant AF AFOSR62 420

Unclassified report

Pub. in Journal of Geophysical Research v70 n6 p1415-27 Mar 15 1965 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 27 Oct 64.

Descriptors: (*Earth, Noise), (*Microseisms, Noise), Statistical analysis, Seismic waves, Earthquakes, Probability.

Earth noise below 0.5 cps does not differ significantly from stationary normally distributed random noise for record lengths of the order of hours. Earthquake waves, as well as locally generated ground motion such as that due to wind, produce records which differ significantly from the above. The cross-frequency coherence is a sensitive test for nonstationary effects such as earthquakes, and the more generalized two-dimensional spectrum appears to be the appropriate one for looking at transient events. For stationary processes the bispectrum is a convenient method for testing nonlinear interactions, but microseisms measured so far have produced no cases of significant bispectrums. (Author)

AD-618 665 Div. 2/4
CFSTI Prices: HC$3.00 MF$0.75

Faraday Translations, New York.
INSTRUMENTATION IN SURVEYING. PART I. FUNDAMENTALS OF INSTRUMENTATION,
by Fritz Deumlich. Aug 65, 92p
Contract DA44 009AMC397T
AERDL T-1754a-65; TT 65-62719

Unclassified report

Trans. from Instrumentenkunde der Vermessungstechnik 2nd ed. Berlin, 1963.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Surveying, Instrumentation), (*Instrumentation, Surveying), Distance-measuring equipment, Optical equipment, Electronic equipment, Reviews, East Germany.

AD-618 667 Div. 2/4
CFSTI Prices: HC$6.00 MF$1.25

Faraday Translations, New York.
INSTRUMENTATION IN SURVEYING. PART II. INSTRUMENTS FOR STAKING-OUT AND MEASURING HORIZONTAL ANGLES,
by Fritz Deumlich. Aug 65, 204p
Contract DA44 009AMC397T
AERDL T-1754b-65; TT 65-62721
Unclassified report

Trans. of Instrumentenkunde der Vermessungstechnik 2d ed, Berlin, 1963, p103-240, 471-9. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Surveying, Instrumentation), (*Instrumentation, Surveying), East Germany, Measurement, Distance - measuring equipment, Theodolites, Optical equipment.

Contents: Instruments for the development of right angles and accumbent angles; Simple instruments for the measurement and determination of arbitrarily large horizontal angles; The theodolite and its provisions for measuring horizontal angles; Construction of the theodolite; Survey of various types of theodolites; Checking and correcting the theodolites.

AD-618 668 Div. 2/4
CFSTI Prices: HC$4.00 MF$0.75

Faraday Translations, New York.
INSTRUMENTATION IN SURVEYING. PART III. INSTRUMENTS FOR MEASURING ELEVATIONS AND ELEVATION DIFFERENCES,
by Fritz Deumlich. Aug 65, 104p
Contract DA44 009AMC397T
AERDL T-1754c-65; TT 65-62722
Unclassified report

Trans. from Instrumentenkunde der Vermessungstechnik 2d ed. Berlin, 1963.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Surveying, Instrumentation), (*Instrumentation, Surveying), East Germany, Measurement, Distance-measuring equipment, Optical equipment.

Contents: Simple instruments for geometric leveling, Leveling instrument, Instruments for measuring vertical angles, Instruments for barometric measurement and elevations, Fully automatic elevation recorders.

AD-618 669 Div. 2/4
CFSTI Prices: HC$3.00 MF$0.75

Faraday Translations, New York.
INSTRUMENTATION IN SURVEYING. PART IV. INSTRUMENTS AND DEVICES FOR MEASURING DISTANCES,
by Fritz Deumlich. Aug 65, 75p
Contract DA44 009AMC397T
AERDL T-1754d-65; TT 65-62723 Unclassified report

Trans. from Instrumentenkunde der Vermessungstechnik 2d ed. Berlin, 1963.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Surveying, Instrumentation), (*Instrumentation, Surveying), (*Distance-measuring equipment, Surveying), Optical equipment, Range finding, East Germany.

Contents:
Instruments and devices for immediate (mechanical) measurement of distances
Instruments and devices for optical measurement of distances
Instruments for electrical measurement of distances.

AD-618 670 Div. 2/4
CFSTI Prices: HC$3.00 MF$0.75

Faraday Translations, New York.
INSTRUMENTATION IN SURVEYING. PART V. INSTRUMENTS FOR TACHYMETRY,
by Fritz Deumlich. Aug 65, 54p
Contract DA44 009AMC397T
AERDL T-1754e-65; TT 65-62724 Unclassified report

Trans. from Instrumentenkunde der Vermessungstechnik 2d ed. Berlin, 1963.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Surveying, Instrumentation), (*Instrumentation, Surveying), Distance-measuring equipment, East Germany.

Contents: Non-reducing Stadia instruments
Self-reducing tachymeters
Plane table and alidade.

AD-618 671 Div. 2/4
CFSTI Prices: HC$2.00 MF$0.50

Holman, (John F.), Co., Inc., Washington, D. C.
INSTRUMENTATION IN SURVEYING. INDEX FOR PARTS I, II, III, IV AND V,
by Fritz Deumlich. Aug 65, 26p
Contract DA44 009AMC39T
AERDL T-1754x-65; TT 65-62725
Unclassified report

Trans. from Instrumentenkunde der Vermessungstechnik 2d ed. Berlin, 1963.

Descriptors: (*Surveying, Instrumentation), (*Instrumentation, Surveying), Distance-measuring equipment, Optical equipment, Electronic equipment, Indexes, East Germany.

AD-618 680 Div. 2/9
MF$0.75

Naval Oceanographic Office, Washington, D. C.
PREDICTION OF THE 400-FOOT TEMPERATURE IN THE NORTH ATLANTIC.
Technical rept.,
by P. A. Mazeika. Jun 65, 62p
Rept. nos. TR-147; ASWEPS-10
Unclassified report

Also available in hard copy from U. S. Naval Oceanographic Office, Washington, D. C., $1.00.

Descriptors: (*Atlantic Ocean, Bathythermograph data), (*Oceanology, Atlantic Ocean), (*Bathythermograph data, Atlantic Ocean), Oceans, Thermal properties, Oceanographic data, Graphics, Marine geophysics, Mathematical predictions.

Equations for computing mean temperature at 400 feet in the North Atlantic in terms of mean annual surface temperature and its amplitude have been derived from BT data collected at five ocean weather stations and in three other widely separated areas. By use of temperature anomaly values at 400 feet, as related to mean surface temperature anomalies, the temperature at 400 feet can be predicted several days in advance with an approximation of 1.1 F. (Author)

09. Electronics and Electrical Engineering

AD-617 912 Div. 8/2, 25/2, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Bulova Watch Co., Woodside, N. Y. Electronics Div.
PRODUCTION ENGINEERING MEASURE FOR TYPE CR-(XM-60)/U CRYSTAL UNITS.
Quarterly rept. no. 3, Jan-Mar 65,
by R. F. Woolley. Mar 65, 16p
Contract DA36 039AMC03633E

Unclassified report

See also AD-614 074.

Descriptors: (*Crystals, Semiconductor devices), (*Crystal holders, Manufacturing methods), Low frequency, Copper, Welding, Ultrasonic radiation, Welds, Electric wire, Quartz resonators, Chemical milling, Etched crystals, Processing, Reliability-(Electronics), Aluminum, Aging(Materials), Medium frequency.

The report details the problems involved in obtaining satisfactory copper Kold-Weld holders of the HC-6/U configuration; attempts at obtaining satisfactory lead attachment by means of ultrasonic welding techniques; results of investigations to improve processing and fabrication techniques; and results obtained during the first two months of the reliability study of CR-47A/U crystal units. (Author)

AD-617 917 Div. 8/4
CFSTI Prices: HC$2.00 MF$0.50

Army Electronics Command, Port Monmouth, N. J.
DEVELOPMENT OF ELECTROSTATICALLY FOCUSED SUPPORTED-DRIFT-TUBE KLYSTRON OSCILLATORS.
Technical rept.,
by Arthur Wachtenheim, John J. Tancredi, and Arthur Gottfried. Apr 65, 26p Rept. no. ECOM-2584
Proj. 1P6 22001A055, Tasks 1P6 22001A055 04, 1P6 22001A055 04 62

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Klystrons, Scientific research), X band, Microwave oscillators, Focusing, Electrostatic fields, Magnetic fields, Feasibility studies, Electron guns, Beams(Electromagnetic), Manufacturing methods, Microwave equipment.

The report describes the design of 10-milliwatt and one-watt X-band, supported-drift-tube klystron oscillators. Technological construction problems and their solutions are also discussed. A number of beam testers were constructed to investigate beam transmission problems. Because of the poor beam transmission, no operable klystrons were built. The beam transmission problem will have to be solved before successful tubes can be fabricated. (Author)

AD-617 928 Div. 8/1, 25/3
CFSTI Prices: HC$1.00 MF$0.50

Cruft Lab., Harvard Univ., Cambridge, Mass.
ANTENNA INSIDE A MAGNETOPLASMA-FILLED PARALLEL-PLATE WAVEGUIDE.
Interim scientific rept.,
by B. Rama Rao. 15 Mar 65, 23p
Rept. no. SR-11(Series 3)
Contract AF19 628 2406; Grant NSF GP851,
Proj. 5635, Task 563502
AFCRL 65-401

Unclassified report

Descriptors: (*Plasma sheath, Antennas), (*Waveguides, Plasma sheath), (*Antennas, Waveguides), Electric currents, Electrical impedance, Admittance, Plasma medium.

An antenna inside a magnetoplasma-filled parallel-plate waveguide is considered. Its behavior at the Pythagoras (upper hybrid resonance) frequency and the plasma resonance frequency was studied. The effect of the magnetoplasma medium on the feed-point singularity of the antenna current was also investigated. (Author)

AD-617 932 Div. 8/2, 2/7
CFSTI Prices: HC$3.00 MF$0.75

Motorola, Inc., Scottsdale, Ariz. Military Electronics Div.
VISTAR FIELD ENGINEERING.
Final rept. for 1 Jan 64-31 Mar 65,
by H. Bretzel and G. Klinzer. 30 Apr 65, 65p
Rept. no. WF-2982
Contract AF19 628 4018, Proj. 6672, Task 667204
AFCRL 65-354

Unclassified report

Descriptors: (*Doppler radar, Meteorological radar), (*Meteorological radar, Airborne), (*Coherent radar, Meteorological radar), X band, Radar transmitters, Radar receivers, Wiring diagrams, Radar pulses, Data processing systems.

The VISTAR program history is outlined, indicating the early objectives to modify a previously-constructed X-band, pulse Doppler radar for airborne weather analysis. The extreme difficulties in securing a modulator with the high pulse repetition frequencies (3500-7000 pps) for the 50 kilowatt peak power klystron amplifier are noted, which eventually led to a modification in program plans to include ground operation only. Transmitter/receiver modifications and data processor work are presented. Circuit diagram corrections and additions are given and a set of subassembly identification pictures are included. Complete circuit schematics and theory of operation are not part of this report. Appendix 1 outlines an alternate approach to the airborne radar instrumentation. A hih duty cycle, low peak power (120 watts), half-microsecond magnetron transmitter is used to reduce weight. Coherence is established in the receiver via delay-line storage of the transmitter pulse, heterodyned to an i-f frequency (55 Mc). Tape recording of the Doppler spectrum at 25 range intervals provides the history necessary for spectral analysis on the ground after flights. An antenna that employs electromechanical stabilization of the beam to compensate for pitch motion of the aircraft is discussed. (Author)

AD-617 933 Div. 8/2, 5/2
CFSTI Prices: HC$4.00 MF$1.00

Ling-Temco-Vought, Inc., Dallas, Tex. Military Electronics Div.
STABILIZED MASTER OSCILLATOR.
Final rept.,
by G. D. Bassham. Dec 64, 142p
Contract FA WA4259, Proj. 221 110 08C
SRDS RD-64-115

Unclassified report

Descriptors: (*Radiofrequency oscillators, Radio

equipment), (*Radio equipment, Radiofrequency oscillators), (*Stabilization systems, Radiofrequency oscillators), Radio transmitters, Radio receivers, Very high frequency, Ultrahigh frequency, Digital systems, Phase-locked communication systems, Reliability(Electronics).

The report covers the development and fabrication of two engineering model stabilized master oscillator (SMO) systems to be used ultimately at FAA radio communications transmitter and receiver stations to control the frequencies of all the VHF and UHF communication transmitters and receivers in a station. The SMO system allows each transmitter and each receiver to operate on any assigned channel within its frequency range without the necessity of stocking a large number of crystals. Each channel frequency is derived from a common, highly stabilized reference source. A block diagram of the SMO system developed is shown. The system consists of one master reference oscillator system which furnishes the basic system reference frequency and ten slave oscillators which furnish outputs in ranges and increments as prescribed in the FAA SMO specification. All the slave oscillator outputs are phase locked to the reference frequency by means of a DIGITAL technique (DIGISMO) as described in Temco Electronics Proposal R24-406. (Author)

AD-617 944 Div. 8/1, 8/6
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
ATMOSPHERIC NOISE POWER AVAILABLE AT THE OUTPUT OF AN ELEVATED RADIOMETER ANTENNA.
Interim rept.,
by O. D. Sledge. Jun 65, 24p
NRL memo. rept. 1619
Proj. RMWC42 130 652 1F001 05 01
Unclassified report

Descriptors: (*Radiometers, Antennas), (*Antennas, Radiometers), (*Radiofrequency interference, Atmosphere), Airborne, Power, Attenuation, Extremely high frequency, Thermal radiation, Temperature, Absorption, Numerical analysis, Microwaves.

Formulae are developed for the atmospheric noise power available at the output of an airborne radiometer antenna of narrow beamwidth. The theoretical model chosen for the antenna possesses characteristics which are fairly representative of the radiators met in practice. In a numerical example, in which the beam-depression angle is taken to be 30 degrees, the theory is applied to the calculation of the atmospheric path attenuation and the effective atmospheric noise-temperature of the elevated antenna for a number of frequencies and antenna heights. The path attenuation varies from 0.2 db at 5000 feet of altitude and a frequency of 35 gc to 1.7-2.5 db at heights of 30,000 feet or more and at frequencies of 80 to 100 gc. The effective noise-temperature of the antenna is 20 K at 10,000 feet altitude and at a frequency of 35 gc. As the frequency is elevated to 75 gc, the altitude remaining at 10,000 feet, the noise-temperature of the antenna increases to 80 K. (Author)

AD-617 951 Div. 8/2, 2/10
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
STATISTICAL SYNTHESIS OF A pP-WAVE ENHANCER.
Technical note,
by R. Price. 14 Jun 65, 10p Rept. no. TN-1965-22
Contract AF19 628 500, ARPA Order 512
ESD TDR-65-235 Unclassified report

Descriptors: (*Filters(Electromagnetic wave), Statistical analysis), (*Seismographs, Filters(Electromagnetic wave)), Nonlinear systems, Communication theory, Optimization, Synthesis, Seismic waves.

A communication-theoretic rationale for a successful nonlinear processing scheme due to Shimshoni and Smith is provided by showing its resemblance to minimum-rms-error estimation. The latter filtering, although 'optimum' under certain assumptions, is rather more complicated in its implementation. As in all such filtering studies, the mean-square error is made up of bias, or signal distortion, and variance (which in linear filtering is attributable only to the noise). It would be interesting to see whether the filtering developed here could be modified to allow a controlled tradeoff between these two sources of error. (Author)

AD-617 958 Div. 8/2, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
RELIABLE DIELECTRIC FILMS FOR MICROCIRCUITS.
Final rept. for 1 Apr 64-31 Mar 65,
by Saul W. Chaikin and Gilbert A. St. John. May 65, 65p
Contract DA36 039AMC02204E, Projs. 1C024401A11204, PMU4919
Unclassified report

Descriptors: (*Dielectric films, Circuits), (*Microminiaturization(Electronics), Circuits), (*Circuits, Dielectric films), Sputtering, Electrodes, Capacitors, Semiconducting films, Silicon compounds, Monoxides, Nitrides, Titanium compounds, Dioxides, Aluminum, Electron microscopy, Life expectancy.

By means of electron microscope study techniques, important properties of aluminum electrode edges were determined. Premature capacitor breakdown at edges is most likely caused by a 3 to 5 fold field enhancement at the edge. The taper at electrode edges is 5 degrees or less, with a radius of about 200 A at the tip of the edge. Such a razor edge will give rise to field enhancement such that the edges can be at breakdown voltage while the planar portion of the capacitor is not. It was found that electrical leakage of SiO capacitors is enormously sensitive to deposition rate and somewhat sensitive to thickness; and that deposition rate and thickness interact in their effect on leakage. Life tests of SiO capacitors of 1000 A and 10,000 A dielectric thicknesses at 85 C and 10,000 A thickness at 125 C were successful showing that fabrication procedures developed in a predecessor contract represented an improvement over existing procedures. (Author)

AD-617 959 Div. 8/2, 26/1
CFSTI Prices: HC$6.00 MF$1.25

McCoy Electronics Co., Mount Holly Springs, Pa.
GLASS INCLOSED CRYSTAL UNITS CR-(XM-17)/U.
Final rept.,
1965, 211p
Contract DA36 039SC81269
Unclassified report

See also AD-606 992.

Descriptors: (*Crystal holders, Manufacturing methods), (*Glass, Crystal holders), Quartz resonators, Medium frequency, High frequency, Processing, Aging(Materials), Quality control, Performance-(Engineering).

The report consists of four basic sections. Problems

and solutions encountered in design fabrication and testing of the CR-(XM-17)/U crystal unit discussed under Section I. Also included is economic information comparing cost factors of metal versus glass holder packaging. In Section II, data obtained in performing various tests on a total of 225 units is presented. Processing details for fabricating the CR-(XM-17)/U crystal unit is outlined under Section III. Section IV consists of a Quality Control and Inspection Plan. Identification of Key Personnel, Man Hours Expended, Publications and Conference information is included in this report. (Author)

AD-617 961 Div. 30/2, 25/4, 25/2
CFSTI Prices: HC$3.00 MF$0.75

Carson Labs., Inc., Bristol, Conn.
RESEARCH TO DEVELOP TECHNIQUES FOR OPTICAL ANALOG MULTIPLICATION OF LARGE SCALE MATRICES.
Interim scientific rept.,
by Richard A. Knapp. Jul 65, 56p Rept. no. SR-1
Contract AF19 628 4311, Proj. 4641, Task 464104
AFCRL 65-493

Unclassified report

Descriptors: (*Analog computers, Combinatorial analysis), (*Combinatorial analysis, Matrix algebra), (*Optical phenomena, Analog computers), (*Color centers, Optical properties), Computer logic, Crystals, Alkali metal compounds, Halides, Crystal lattice defects, Data processing systems.

Research is described covering a series of investigations in which the applicability of several optical processes which take place in alkali halide crystals to the problem of optical analog multiplication of large scale matrices was determined. Experiments included in this program of research were (1) measurements to determine several low temperature properties of F and F' centers in KCl and KBr; (2) experiments on the formation, stability, and optical removal of complex centers in hydrogenated KCl; (3) investigations of the intensity dependence of room-temperature F center bleaching in hydrogenated KBr; (4) and semi-quantitative measurements of the optical thickness changes caused by room-temperature ultraviolet generation of F centers in hydrogenated KBr. A discussion of several possible methods of performing optical multiplication, and a brief review of color centers in alkali halide crystals, are included. Also included are separate sections by different authors describing methods of preparing additively colored alkali halide crystals, and describing the development of a computer program to perform certain color center calculations. (Author)

AD-617 992 Div. 8/2

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
BOUNDS ON THE NATURAL FREQUENCIES OF LC STRUCTURES,
by Harry B. Lee. 13 Jul 64, 2p
Contract DA36 039AMC03200E

Unclassified report

Pub. in IEEE Transactions on Circuit Theory vCT12 n1 p127-8 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Inductance, Circuits), (*Capacitance, Circuits), (*Circuits, Theory), Oscillation, Frequency, Electric currents, Voltage.

AD-617 994 Div. 8/3, 8/2

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
DYNAMICALLY INDEPENDENT EQUILIBRIUM EQUATIONS FOR RLC NETWORKS.
Revised ed.,
by C. F. Price and A. Bers. 30 May 64, 4p
Contract DA36 039AMC03200E

Unclassified report

Pub. in IEEE Transactions on Circuit Theory vCT12 n1 p82-5 Mar 1965 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 5 Aug 63.

Descriptors: (*Electrical networks, Differential equations), (*Topology, Electrical networks), Voltage, Capacitance, Inductance, Circuits, Matrix algebra.

This paper presents a systematic derivation of a system of first-order dynamically independent equilibrium equations for an RLC network. The dynamically independent equations are obtained from a set of topologically independent equilibrium equations which are written in terms of a judiciously chosen set of independent, current and voltage, network variables. It is thus shown that superfluous variables, which are the result of dynamic constraints on the network, can be eliminated by inspection. Finally a method for writing the dynamically independent equilibrium equations by inspection of the network is presented. Thus we show that by the above techniques the set of dynamically independent equations can be obtained with little more labor than the more conventional equilibrium equations whose variables are only topologically independent. (Author)

AD-618 021 Div. 8/1, 12/1
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Corp., El Segundo, Calif.
LARGE UNFURLABLE ANTENNAS,
by P. L. Bargellini and R. L. Glasser.
22 Jul 64, 20p Rept. no. TOR-469(5107-37)-1
Contract AF04 695 469

Unclassified report

Descriptors: (*Unfurlable antennas, Spacecraft), (*Satellite antennas, Unfurlable antennas), Gain, Extentable structures, Inflatable structures, Antenna configurations, Design, Space environmental conditions.

Contents: Antennas in space - general considerations; Existing designs of proposals of unfurlable antennas for space environment; Proposed structures for very large antennas; Large space antennas as an MOL experiment; Structural problems of large antennas.

AD-618 035 Div. 8/1, 8/7
CFSTI Prices: HC$2.00 MF$0.50

Syracuse Univ., N. Y. Research Inst.
TRANSIENT AND STEADY-STATE ANTENNA PATTERN CHARACTERISTICS FOR ARBITRARY TIME SIGNALS.
Interim rept. no. 10,
by Fung-I Tseng and David K. Cheng. Jun 65, 27p
Rept. no. EE-957-6503T10
Contract AF30 602 2646, Proj. 4506, Task 450604
RADC TR-65-101

Unclassified report

Descriptors: (*Radar antennas, Antenna radiation

patterns), (*Antenna radiation patterns, Radar antennas), Radar scanning, Time signals, Transients, Stability, Electronic scanners, Pulse compression.

This report presents a simplified method for the analytical determination of the transient and steady-state pattern characteristics of an antenna for arbitrary time signals and arbitrary aperture distributions. For uniform aperture illumination, the pattern response of an antenna for any time signal, no matter how complicated, can be found through simple shifts of the signal, and both the transient and the steady-state behavior can be determined without performing any integration. Examples are given for responses to suddenly applied excitations, to rectangular pulses, to excitations for electronic scanning, and to time signals in a pulse-compression system. For pulse signals, a steady state is not reached in any given direction, theta, if the duration of the pulse T is less than (a/c) sin theta, where a is maximum aperture dimension and c is velocity of light. Graphical representations for easy interpretation of the different states of pattern characteristics are included. (Author)

AD-618 036 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

Electrical Engineering Research Lab., Univ. of Illinois, Urbana.
STUDY AND INVESTIGATION OF MILLIMETER AND SUBMILLIMETER WAVE RECEIVER TECHNIQUES.
Quarterly rept. no. 6, 10 Oct 64-31 Dec 64,
by J. R. Baird, J. E. Degenford, and E. Yamashita.
Jun 65, 29p
Contract AF30 602 3046, Proj. 4505, Task 4505 01
RADC TR-65-127
Unclassified report

See also AD-611 536.

Descriptors: (*Millimeter waves, Demodulation), (*Demodulators, Millimeter waves), Video signals, Transmission lines, Tunnel diodes, Waveguides, Helixes, X band, Radio receivers.

This program has as its goal the development of video and superheterodyne detection techniques which are appropriate for the millimeter and submillimeter range of the spectrum. A theoretical method of analysis of a tunnel diode in a waveguide is developed and the results are correlated with experimental data of other experimentors. Results are given for twelve loop detectors which were tested at 4mm and for an X-band model. (Author)

AD-618 048 Div. 8/2
CFSTI Prices: HC$6.00 MF$1.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SEMICONDUCTOR THERMISTORS IN AUTOMATION,
by G. K. Nechaev. 20 Apr 65, 262p
Rept. no. FTD-MT-64-210
TT 65-62640
Unclassified report

Edited machine trans. of mono. Poluprovodnikovye Termosoprotivleniya v Avtomatike, Kiev, 1962, p1-254. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Thermistors, Semiconductor devices), (*Circuits, Thermistors), USSR, Automation, Physical properties, Circuits, Transients, Mathematical analyses, Temperature control, Measurement, Temperature, Voltage regulators, Electric bridges.

The book describes the physical properties and characteristics of semiconductor heat-dependent resistors--thermistors which are the compound elements of circuits of automatic devices. Methods are considered for the calculation of static and dynamic conditions in circuits with thermistors. Methods are expounded for the calculation of temperature compensators and stabilizers, bridge circuits of different purposes relay circuits and other circuits with thermistors used in devices of automation. Descriptions are given of several automatic devices with application of thermistors. The book is intended for scientists and engineers working in the area of automation, and also for students of power engineering higher educational institutions.

AD-618 051 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
WIDEBAND FM TRANSMITTERS AND RF-TO-RF REPEATERS FOR SPACE APPLICATIONS,
by R. T. Murphy. 1965, 28p Rept. no. 5-13-65-11
Unclassified report

Descriptors: (*Radio transmitters, Space communication systems), (*Space communication systems, Radio equipment), (*Microwave relay systems, Space communication systems), Broadband, Frequency modulation, S band, X band, Microwave equipment, Microwave oscillators, Traveling-wave tubes, Semiconductor devices, Performance(Engineering), Frequency converters, Power amplifiers, Pumping(Electronics), Transistor amplifier.

This report discusses the design philosophy of wideband FM transmitters and RF repeaters for space applications in the S-band and X-band frequency ranges. The salient features of several transmitter configurations, including direct RF generation at the output frequency, are compared. The discussion shows the solid state microwave oscillator to be a logical choice to generate a wideband FM signal for space applications. Back-to-back repeaters, heterodyne repeaters, and reflex repeaters are compared for use in a satellite communication relay link. The RF-to-RF repeater, utilizing a traveling wave tube in a reentrant or reflex mode, is shown to give superior performance for space missions requiring broadband, multiple-access capabilities. (Author)

AD-618 055 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

Sprague Electric Co., North Adams, Mass.
PRODUCTION ENGINEERING MEASURE FOR COLUMBIUM CAPACITORS.
Quarterly rept. for 26 Sep 64-26 Jan 65,
by J. H. D. Folster, E. E. Holley, and A. Whitman.
26 Jan 65, 23p
Contract DA36 039AMC01468E
Unclassified report

See also AD-610 022.

Descriptors: (*Capacitors, Niobium), (*Electrolytic capacitors, Manufacturing methods), Life expectancy, Performance(Engineering), Voltage, Capacitance, Failure(Mechanics).

The inspection and life testing of the ratings required for the preproduction run were completed. The results

of these tests, together with the findings of studies conducted at Sprague's own expense, indicate that columbium cannot be used as a direct replacement for tantalum in electrolytic capacitors. It is Sprague's conclusion that the basis characteristics and limitations of columbium are such that the contract objectives are beyond the capability of the materia. (Author)

AD-618 077 Div. 30/2
CFSTI Prices: HC$1.00 MF$0.50

Pittsburgh Univ., Pa. Computation and Data Processing Center.
PROGRESS IN COMPUTERIZED TYPESETTING,
by Lee Ohringer. 1965, 14p
Contract SD186; Grant NSF GP2310
Unclassified report

Reprint of paper presented at the Annual Meeting of the Technical Association of the Graphic Arts (17th), Park Plaza, Toronto, Ontario, Canada, 1 Jun 65.

Descriptors: (*Digital computers, Printing), (*Printing, Digital computers), Indexes, Dictionaries, Textbooks, Programming Languages, Programming(Computers), Magnetic tape, Punched tape.

New ways were studied in which the computer can be used to aid the printer. Experiments were conducted using advanced concepts such as computerized editing routines and typesetting of complex material. The programs which were written for the computer enable the editor to see the changes he wishes effected immediately on the text using a display screen which is electronically controlled by the computer. Computerized indexing methods were developed, and the computer was used to generate a dictionary of current scientific terms from a text.

AD-618 092 Div. 8/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DEVICE FOR COUPLING WAVEGUIDES,
by A. P. Matyukhin. 7 Jul 65, 5p
Rept. no. FTD-TT-65-336
TT 65-62649
Unclassified report

Unedited rough draft trans. of Russian Patent 159 206, pub 14 Jul 61, appl. 738156/26-9.

Descriptors: (*Waveguide couplers, Design), USSR, Patents, Elasticity, Joining, Supports, Waveguides.

The object of the invention is a device for coupling waveguides where the joining is made easy through the use of the elasticity of the waveguide. For the purpose of assuring the preservation of the parallel arrangement of the joined flanges and simplifying the composition it is designed in the form of waveguides of zigzag shape provided with supports and set in a rigid framework. (Author)

AD-618 094 Div. 8/2

Naval Ammunition Depot, Crane, Ind.
MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR NAVY EQUIPMENTS.
1 Jun 65, 77p Rept. nos. Micro-N-12; NAD-Crane-65-451
Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Naval equipment, Microminiaturization-(Electronics)), (*Microminiaturization(Electronics), Naval equipment), (*Electronic equipment, Airborne), Epitaxial growth, Germanium, Semiconductors, Integrated circuits, Analog systems, Digital systems, Configuration, Transistors, Video amplifiers, Computer logic, Single sideband communication systems, Semiconductor devices.

Contents: Epitaxial studies (Part III); Resume on MOS field effect analysis; Evaluation of signetics analog semiconductor integrated circuits; Evaluation of sprague digital semiconductor integrated circuits; Evaluation of siliconix digital semiconductor integrated circuits in an adder/subtractor configuration; Microelectronic approach to the design and development of the AN/ARC-104 (XZ-2 and XZ-3); Compilation of semiconductor integrated circuits evaluated to date.

AD-618 102 Div. 8/1
CFSTI Prices: HC$3.00 MF$0.75

Philco, Blue Bell, Pa. Aeronutronic Div.
NON-PLANAR ARRAY 'THINNING' STUDY.
Quarterly interim rept. no. 3, 16 Oct-31 Dec 64,
by Charles E. Clarke and Thomas J. B. Shanley.
Apr 65, 77p Rept. no. 2594-3
Contract AF30 602 3337, Proj. 4506, Task 450604
RADC TR-65-19
Unclassified report

See also AD-614 906.

Descriptors: (*Phased arrays, Radar antennas), (*Radar antennas, Antenna configurations), Radar scanning, Antenna radiation patterns, Spheres, Hemispherical shells, Mathematical models, Statistical analysis, Mathematical prediction, Simulation, Programming(Computers), Design.

The report describes an investigation to establish guidelines for designing thinned, nonuniformly spaced array antennas of spherical or hemispherical configuration: Development of generally applicable analytical approximations for the means and variances of the probability density functions for the quadrature components of the field. Previous work had developed estimates valid only for small angles off the main beam. Development of analytical expressions for: (a) the probability density function of sidelobe magnitude anywhere in the pattern, (b) the mean-squared far sidelobes, (c) the probability density function of the 3-db beamwidth, and (d) the sidelobe magnitude not exceeded anywhere in the far sidelobes with a specified assurance. These expressions are all functions of the degree of thinning and of element directivity. Completion of a comprehensive set of computer simulation runs from which ten, independent sample patterns are available for each of several array designs featuring different degrees of thinning and different element directivity characteristics. Preliminary examination of the agreement between the analytical predictions and the computer results. (Author)

AD-618 104 Div. 8/2, 26/1
CFSTI Prices: HC$2.00 MF$0.50

Systems, Inc., Orlando, Fla.
PEM FOR FILTERS, UPPER SIDEBAND (1.75 MC) QUARTZ CRYSTALS TYPE EL-FR(X-1).
Quarterly progress rept. no. 3, 31 Dec 64-31 Mar 65.
31 Mar 65, 28p
Contract DA36 039AMC03636E
Unclassified report

See also AD-612 603.

Descriptors: (*Crystal filters, Manufacturing methods), (*Quartz, Radiofrequency filters), Medium frequency, Performance(Engineering), Band-pass filters, Capacitance, Sidebands, Temperature.

The measured response characteristics of five Type I (18 crystal, equal motional capacitance design) and five Type III (12 crystal, equal motional capacitance design) filters are given and discussed. Difficulties with temperature compensation of the Type III filters would require considerable engineering to perfect this design, so subsequent effort will be concentrated on the Type I design. (Author)

AD-618 105 Div. 8/2, 25/4
CFSTI Prices: HC$1.00 MF$0.50

Varian Associates, Beverly, Mass.
THALLIUM BEAM TUBE RESEARCH.
Quarterly progress rept. no. 3, 1 Jan-30 Apr 65,
by Richard F. Lacey. 30 Apr 65, 16p
Contract DA28 043AMC00350E, Proj. 1P6 22001A058
Unclassified report

See also AD-612 933.

Descriptors: (*Thallium, Beam power tubes), (*Beam power tubes, Thallium), Molecular beams, Ionization, Cavity resonators, Electron optics, Atomic clocks, Frequency, Standards, Iridium, Work functions, X band, Waveguides, Ionic currents, Microwave frequency.

Task I. Additional testing of an iridium ionizer showed an ionization efficiency for thallium of 3.7% depending markedly on ambient pressure at lower temperatures. Attempts were made to deposit higher work function coatings on tantalum, but the deposits did not adhere. Other possible methods of ionizing a thallium beam have been studied. Task II. Tests on an X-band model of a proposed thallium waveguide structure showed the necessity for adequate mode suppression in order to use the coaxial design. Further, the extension of the bare quartz inner cylinder in a region of high electric field in the ends of the cavity appears to be unsatisfactory. Calculations were made on the perturbation caused by putting the cylinder at the electric field null of a cavity operating in the TE(021) mode. Task III. A prototype quadrupole magnet is under construction. (Author)

AD-618 113 Div. 8/7
CFSTI Prices: HC$3.00 MF$0.75

Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
APPLICATION OF SIGNAL THEORY TO SIGNAL DETECTION.
Technical rept.,
by R. H. Wilson and F. H. Middleton. 28 Jan 65, 91p
Rept. no. TR-8
Contract Nonr39612, Projs. RR001 03 05, NR185 700
Unclassified report

Descriptors: (*Communication theory, Signals), (*Signals, Detection), (*Matched filters, Synthesis), Signal-to-noise ratio, Electromagnetic pulses, Analog computers, Functions, Polynomials.

Matched filters are often used in signal detection shemes. Using the field of signal theory and orthonormal functions as a basis, a method of synthesizing matched filters is presented. The mathematical background is developed and the theory is tested by obtaining an approximate matched filter for detecting a square pulse. This filter is simulated on an analog computer and detection of the square pulse is attempted with additive white noise also on the filter input. These tests show that the filter developed can detect the pulse as hoped. Additionally, the filter can be adjusted to match other signals within its processing range with ease. (Author)

AD-618 125 Div. 30/2, 20/5
CFSTI Prices: HC$4.00 MF$1.00

David Taylor Model Basin, Washington, D. C.
SPECIFICATIONS FOR FLAME 1: A THREE-DIMENSIONAL REACTOR DEPLETION CODE FOR THE UNIVAC-LARC.
Applied mathematics lab. research and development rept.,
by Elizabeth H. Cuthill, Joanna W. Schot, Barbara Gibson, and Raymond Mejia. Jun 65, 135p
Rept. no. 1477
Proj. S R003 10 01, Task 10924
Unclassified report

Descriptors: (*Fuel burn up, Programming(Computers)), (*Programming(Computers), Fuel burn up), (*Reactor control, Programming(Computers)), Specifications, Fuel consumption, Reactor fuel elements, Matrix algebra, Groups(Mathematics), Iterative methods.

The mathematical and programming specifications for FLAME 1, a three-dimensional reactor depletion code for the UNIVAC-LARC, are described. Two, three, or four lethargy groups and up to approximately 100,000 mesh points are permitted, depending on the number of groups. Mesh spacing is variable in the x-, y-, and z-directions, and up to 400 different material compositions may be distributed among the regions comprising the reactor. Thirty elements, including 13 time-dependent isotopes, are treated in the depletion scheme. The full coefficient matrix generated for each group contains of the order of 100,000 x 100,000 entries. A detailed description of the calculations performed by the code is presented, including the mathematical derivation of the normalized block iteration method used for calculating flux values and the extrapolated power method for computing the fission source and criticality factor. (Author)

AD-618 141 Div. 30/2
CFSTI Prices: HC$1.00 MF$0.50

Stelma, Inc., Stamford, Conn.
DEVELOPMENT OF (PCM) DATA BUFFERS.
Quarterly progress rept. no. 7, 22 Jan-25 Apr 65,
by W. Reymond. 18 May 65, 16p
Contract DA36 039AMC03186E
Unclassified report

See also AD-448 494.

Descriptors: (*Data transmisson systems, Design), (*Digital systems, Design), Multiplex, Computer logic, Printed circuits.

The purpose of this project is the design and construction of four advanced development models of a low-speed and two of a high-speed converter (PCM Buffer), digital-to-digital -- each for inserting a number of digital data channels into Data I or Data II of the PCM Multiplexers TD-352( )/U or TD-353( )/U. The High-Speed Buffer (Task 1) must be capable of handling synchronous and asynchronous data; the Low-Speed unit (Task 2), synchronous data only. The manufacturing drawings for the high-speed buffer were delivered. The following work was accomplished on the low-speed buffer: (a) Logic design, including that for the Data Source Simulator, was completed. (b) Circuit design, incorporating the changes necessitated by addition of the Voice Order-Wire Facility and the Variable-Output-Rate Capability, was completed.

(c) Mechanical design was completed. Fabrication and assembly is in progress. (d) All printed-circuit-card types passed preproduction tests satisfactorily.

AD-618 194 Div. 8/2, 20/3, 25/6, 30/5
CFSTI Prices: HC$1.00 MF$0.50

Bendix Corp., Southfield, Mich.
EXPLORATORY DEVELOPMENT OF THE Q-FACTOR TECHNIQUE.
Quarterly progress letter no. 5 for period ending 30 Jun 65,
by Max Frank. 13 Jul 65, 18p Rept. no. 3034
Contract AF29 601 6316, Proj. 4400
Unclassified report

Descriptors: (*Transistors, Gain), (*Radiation damage, Transistors), Neutron flux, Degradation, Silicon, Electric currents.

Data for predicting transistor gain degradation in a neutron radiation environment were obtained from experimental studies of the variation of the radiation damage constant K as a function of temperature and current during both measurement and irradiation. Relatively small spreads in the values of K were obtained when the individual base transit times were measured and the radiation exposures were precisely determined. Radiation damage effect data from 20 different n-p-n silicon transistor types were obtained and normalized to the same minority carrier concentration in the base region, using the transit time and the V sub BE-I sub C characteristics of the specific transistors. The resulting relative dispersions of the damage constant for minority carrier densities of 10 to the 15th power/cc and 10 to the 16th power/cc were typically 15 to 20 percent. These dispersions indicate that electrical measurements of transistor physical parameters can provide reasonably accurate predictions of the gain degradation for a wide variety of transistors without additional radiation testing of specific transistor types. (Author)

AD-618 205 Div. 8/1
CFSTI Prices: HC$2.00 MF$0.50

Rome Air Development Center, Griffiss AFB, N. Y.
A MULTICAMERA SOLUTION TO THE PROBLEM OF ANTENNA SURFACE DEVIATION AND SUBREFLECTOR ORIENTATION MEASUREMENTS.
Final technical rept.,
by Dean C. Merchant and Charles A. Ballou. Jun 65, 47p Rept. no. RADC-TR-65-212
Proj. 6512, Task 651202
Unclassified report

Descriptors: (*Radar antennas, Calibration), Photogrammetry, Antenna configurations, Surface properties, Antenna radiation patterns, Correlation techniques, Least squares method, Parabolic bodies.

This report describes an improved technique for determining surface deviations of precision radar antennas. Data reduction procedures for determining antenna surface shape and subreflector orientation of a 20 meter radar antenna by means of terrestrial photogrammetry are presented. Raw data in the form of photo coordinates together with assumed camera and antenna orientations are processed in a least squares method analysis to obtain antenna surface deviations and subreflector orientation elements. Additional processed data includes space coordinates and standard errors for all points. Accuracy based on a test case is concluded to be of the order of ±0.3 millimeter for a twenty meter parabolic antenna. (Author)

AD-618 218 Div. 8/3
CFSTI Prices: HC$1.00 MF$0.50

City Coll. Research Foundation, New York.
ELECTROSTATIC FOCUSING OF HOLLOW SPIRALING ELECTRON BEAMS.
Quarterly rept. no. 1, 5 Jan-5 Apr 65,
by Morris Ettenberg. 5 Apr 65, 23p
Contract DA28 043AMC00466E, Proj. 1P6 22001A055 04 70
Unclassified report

Descriptors: (*Electron beams, Focusing), (*Electrostatic fields, Electron beams), Traveling wave tubes, Microwave equipment, Electron guns, Programming-(Computers), Theory, Electric fields, Mathematical analysis.

The conditions for a stable orbit under electrostatic focusing were derived for a coaxial geometry with tangential injection. Small deviations in injection velocity and direction are then considered and the trajectories are found to be stable against small perturbations. A simplified model of a spiral injection scheme is analyzed and found to offer the possibility of proper injection. Computer programs have been prepared to calculate trajectories for a wider range of input parameters and to calculate the potential in the spiral geometry injection scheme. A design for an experimental spiral gun has been prepared. (Author)

AD-618 221 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
A LOW-COST, FAST-RECOVERY TRANSISTORIZED IF AMPLIFIER,
by James M. Barnes. 28 May 65, 23p
Rept. no. TM-65-21
Proj. DA1N222901A207
Unclassified report

Descriptors: (*Transistor amplifiers, Intermediate frequency amplifiers), (*Intermediate frequency amplifiers, Transistor amplifiers), Very high frequency, Automatic gain control, Broadband, Recovery, Gain.

A five-stage, 100-Mc IF amplifier has been designed to improve short-range operation in a superheterodyne pulse radar system. Fast recovery time (0.3 microsec, or less for + 30 dbm into the mixer) and techniques for low-cost production were particularly emphasized in the design objectives. A relatively compact transistorized amplifier (5 cu in., packaged) of straightforward design was realized, with a total gain variation of 5 db over a specified -55 to +75 C range. The performance indicated a suitable recovery time. Certain design considerations toward faster recovery time were rejected, however, on the basis that they would adversely affect some of the desired features such as voltage gain, simplicity of design, and production economy. A satisfactory automatic gain control (AGC) was incorporated in the design providing a 30-db increase in dynamic range. This report describes the design and performance of the IF amplifier. The design was determined feasible for the intended application. (Author)

AD-618 227 Div. 8/2

Army Electronics Labs., Fort Monmouth, N. J.
PARAMETRIC OSCILLATORS,
by W. G. Matthei and M. J. McCormick. 1 Oct 64, 1p
Unclassified report

Pub. in Proceedings of the IEEE v53 n5 p488-9
May 1965 (Copies not available to DDC or Clearinghouse

customers).

Descriptors: (*Microwave oscillators, Pumping(Electronics)), Parametric amplifiers, X band, S band, Klystrons, Varactor diodes, Tuning devices, Resonance, Radio-frequency power.

The parametric oscillator discussed in this paper is a nondegenerate one, i.e., oscillations and, therefore, power outputs are obtained at two discrete frequencies (which correspond to the signal and the idler frequencies of a parametric amplifier). The parametric oscillator was constructed using an X-band waveguide varactor holder which was initially developed as an S-band parametric amplifier. A klystrom at approximately W sub 3 = 12.3 Gc/s was used as the pump source, and powers up to 500 mW were applied to various varactors under various tuning and bias conditions. Oscillations were obtained at the two resonant frequencies (signal equal to approximately W sub 1 = 2.3 Gc/s and idler equal to approximately W sub 2 = 10 Gc/s) and were tunable over a small bandwidth consistent with the frequency relationships W sub 3 = W sub 1 + W sub 2.

AD-618 229 Div. 8/1

Cruft Lab., Harvard Univ., Cambridge, Mass.
CURRENTS, CHARGES, AND NEAR FIELDS OF CYLINDRICAL ANTENNAS AND THE ELECTRIC FIELD VERY NEAR A DRIVEN CYLINDRICAL ANTENNA.
Technical rept.,
by Ronold W. P. King and Tai Tsun Wu. 2 Apr 65, 39p Rept. no. TR-466
Contract Nonr186632, Proj. NR371 016
Unclassified report

Pub. in Radio Science Journal of Research NBS/USNC-URSI v69D n3 p429-446 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Antennas, Mathematical analysis), (*Electric fields, Antennas), Cylindrical bodies, Electric currents, Electromagnetic fields, Integral equations, Numerical analysis, Functions, Voltage.

The commonly made assumption that the distribution of current along a dipole antenna is sinusoidal is examined critically together with the associated distribution of charge and the electromagnetic field. Measured distributions of current and charge are compared with those assumed in the sinusoidal theory. It is shown that the distributions of charge differ so greatly that it must be concluded that the electric field near and along the surface of the actual antenna is not well approximated by the near field obtained with the sinusoidal assumption. A new approximate solution of the integral equation for the current in a center-driven cylindrical antenna is obtained in terms of simple trigonometric functions. It is shown that this and the associated distribution of charge are in much better agreement with measurements than results obtained from the sinusoidal assumption. Approximate expressions are then derived for the electromagnetic field near the antenna in a form that satisfies the boundary conditions. A first-order formula is derived for the component E sub z(rho,z) of the electric field very near to the surface and parallel to the axis of a perfectly conducting center-driven cylindrical antenna with radius a and length 2h. It has the form E sub z(rho,z) = E sub z(z) ln (rho/a) where rho is the radial distance from the axis of the antenna and Ez(z) is a complicated expression that involves generalized sine and cosine integral functions.

AD-618 237 Div. 8/3, 15/1

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
NOTE ON FOURIER COEFFICIENTS OF POWER-LAW DEVICES,
by Paul Penfield, Jr. 2 Nov 64, 1p
Contract DA36 039AMC03200E
Unclassified report

Pub. in Institute of Electrical and Electronics Engineers. Proceedings. v53 n5 p503 May 1965. (Copies not available to DDC or Clearinghouse customers).
See also AD-277 027.

Descriptors: (*Fourier analysis, Power equipment), Integrals, Special functions(Mathematical).

AD-618 247 Div. 8/4, 30/3

Air Force Cambridge Research Labs., Bedford, Mass.
OPERATING CHARACTERISTICS OF A COMMERCIAL RESISTANCE-STRIP MAGNETIC ELECTRON MULTIPLIER.
Instrumentation papers,
by W. W. Hunt, Jr., K. E. McGee, and M. J. Kennedy.
19 Aug 64, 7p Rept. nos. AFCRL-65-353, IP-61
Proj. 8605, Task 860507
Unclassified report

Prepared in cooperation with Wentworth Inst., Boston, Mass. Pub. in Review of Scientific Instruments v36 n1 p110-1 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electron multipliers, Performance-(Engineering)), Gain, Voltage, Mass spectroscopy, Spectrum analyzers, Magnetic fields, Crossed field devices.

The gain of the Bendix Model MDN-105 resistance-strip magnetic electron multiplier, is an extremely sensitive function of the voltage on the several components. The output current measured as a function of Z-plate voltage varies significantly with the cycloid dimensions and the positioning of the electron pulse on the dynode strip. (Author)

AD-618 258 Div. 8/2, 25/6

Defence Research Telecommunications Establishment, Ottawa (Ontario).
ON SOLID-STATE CLASS-D SYSTEMS,
by D. F. Page, W. D. Hindson, and W. J. Chudobiak.
14 Jan 65, 2p
Unclassified report

Pub. in Institute of Electrical and Electronics Engineers. Proceedings v53 n4 p423-4 Apr 1965 (Copies not available to DDC or Clearinghouse customers). Prepared in cooperation with Carleton Univ., Ottawa (Ontario).

Descriptors: (*Transistor amplifiers, Very high frequency), Canada, Transistors, Electronic switches, Power amplifiers, Switching circuits, Electric filters.

AD-618 268 Div. 81/, 25/4

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ON THE SURFACE WAVE DIFFRACTION BY A WEDGE.
Research rept.,
by T. S. Chu and R. G. Kouyoumjian. 24 Mar 64, 9p
Rept. no. EM-202
Contract AF19 628 3868, Proj. 5635, Task 563501
AFCRL 65-343 Unclassified report

Prepared in cooperation with Ohio State Univ., Columbus;

Contract DA36 039SC84920. Publ in IEEE Transactions on Antennas and Wave Propagation vAP-13 n1 p159-64 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Diffraction, Electromagnetic waves), (*Wedges, Antennas), Surfaces.

In two earlier papers the diffraction of a surface wave by a right-angle wedge was treated; one face of this wedge is perfectly conducting and the other is reactive. It was pointed out that the Kirchhoff theory of diffraction provides a useful approximation here. A readily calculable result has not been obtained for wedge angles other than 90 de - grees and 180 degrees, so the diffraction patterns for various wedge angles are calculated here by the Kirchhoff approximation and compared with some measured patterns of a wedge excited by a very narrow H-plane sectorial horn. Both the calculated and measured patterns show that in general the wedge angle has a relatively small effect on the diffraction pattern of a loosely bound surface wave, except when the wedge angle is close to 180 degrees. (Author)

AD-618 272 Div. 8/1

Army Electronics Labs., Fort Monmouth, N. J.
MILLIMETER RESONANCE ISOLATOR UTILIZING MULTILAYER NI AND NIZN FERRITE FILMS,
by W. L. Wade, Jr., R. Stern, and T. Collins.
1965 1p

Unclassified report

Pub. in IEEE Transactions on Microwave Theory and Techniques-p128 Jan 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electromagnetic shielding, Millimeter waves), (*Millimeter waves, Resonance), Microwave equipment, Ferrites, Metal films, Zinc alloys, Nickel alloys.

A significant improvement in the performance of a resonance isolator in the 35-Gc/s frequency region utilizing chemically deposited ferrite films is described.

AD-618 276 Div. 8/3, 8/2

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
PROPERTIES OF MICROWAVE C-SECTIONS,
by G. I. Zysman and A. Matsumoto. 30 Dec 63, 9p
Contract AF30 602 2213
RADC TR-65-285

Unclassified report

Pub. in IEEE Transactions on Circuit Theory vCT12 n1 p74-82 Mar 1965(Copies not available to DDC or Clearinghouse customers.
Prepared in cooperation with Hokkaido Univ., Sapporo (Japan).

Descriptors: (*Microwave networks, Transmission lines), (*Transmission lines, Microwave networks), Filters(Electromagnetic wave), Electrical properties.

In this paper, it is shown that a lossless, three-wire system can act as a C-section in the Richards transformed complex frequency plane. Theoretical limitations on the realization of transmission zeros of such sections are derived. The cascade properties of these networks are also investigated. Specifically, a formulation of an insertion-loss function peculiar to the C-section is made. Finally, integral restrictions on the optimum broadbanding of C-sections, coaxial lines, and frequency sensitive loads are derived. It is hoped that the above treatment willenable the designer to treat the microwave C-section as an additional building block in filter synthesis. (Author)

AD-618 281 Div. 30/2, 15/1

California Univ., Los Angeles.
TOWARDS A GENERAL THEORY OF COMPUTABILITY,
by Richard Montague. 1960, 14p
Grants NSF G19830, NSF G13226

Unclassified report

Pub. in Synthese. An International Quarterly for the Logical and the Psychological Study of the Foundations of Science v12 n4 p429-38 Dec 1960. (Copies available only to DDC users).

Descriptors: (*Computers, Functional analysis), (*Functional analysis, Computers), Digital computers, Analog computers, Effectiveness, Computer logic.

AD-618 300 Div. 30/2, 8/2
CFSTI Prices: HC$3.00 MF$0.75

Kearfott Div., General Precision, Inc., Little Falls, N. J.
INVESTIGATION OF AN ELECTROLUMINESCENT SYMBOLIC INDICATOR.
Final rept. for 29 Jan 64-29 Jan 65,
by Donald Levy and A. Russo. Jun 65, 81p
Contract AF30 602 3316, Proj. 5597, Task 559704
RADC TR-65-103

Unclassified report

Descriptors: (*Display systems, Electroluminescence), (*Data storage systems, Microminiaturization(Electronics)), Computer logic, Switching circuits, Semiconductor devices.

The results of a study, design and breadboard construction of a segmented Electroluminescent (EL) Symbolic Indicator are described. The equipment accepts a parallel 6-bit binary-coded input and converts the data into a symbolic readout on a 23-segment EL panel in response to an ADDRESS command pulse. Display capabilities include all the alpha-numerics, minus sign, plus sign and left and right slant bars. Data storage is implemented at the 23 segment-switching command lines so that a single code converter may be time-shared among many output display modules. The breadboard model of the EL Symbolic Indicator consists of two modules: an output display module and a multiplexed code converter. The specifications for the breadboard model are given. The design and construction of the EL Symbolic Indicator using low-cost conventional components is described. Microminiaturization of the equipment and one possible approach to mechanization using standard off-the-shelf integrated circuit elements are considered. (Author)

AD-618 320 Div. 8/3, 25/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
APPROXIMATE EXPRESSION OF THE 3/2 LAW FOR A CONFINED CATHODE IN A HOMOGENEOUS FIELD,
by I. I. Levintov. 15 Jul 65, 10p
Rept. no. FTD-TT-65-786
TT 65-62663

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, v85 n6 p1247-50 1952.

Descriptors: (*Electron beams, Numerical analysis), (*Cathodes, Electric currents), (*Electric currents, Numerical analysis), Electric fields, Emissivity, Anodes, USSR.

The 3/2 law of Langmuir gives an expression for the density of a current by a volumetric charge for an infinite flat cathode located in the field of an infinite flat anode. An approximation expression is given for the magnitude of current density along the beam axis in the case of a current bounded by a volumetric charge with a cathode having an infinite emission capability and located in a uniform anode field.

AD-618 325 Div. 8/2, 8/5
CFSTI Prices: HC$3.00 MF$0.75

Coordinated Science Lab., Univ. of Illinois, Urbana.
OPTIMIZATION OF SYSTEMS WITH PULSE-WIDTH-MODULATED CONTROL,
by Donald E. Kirk. Jun 65, 71p Rept. no. R-255
Contract DA28 043AMC00073E, Proj. 20014501B31F
Unclassified report

Descriptors: (*Optimization, Control systems), (*Pulse modulation, Control systems), Boundary value problems, Numerical analysis, Calculus of variations, Nonlinear systems.

A new procedure for optimizing the performance of pulse-width-modulated systems is given for plants which may be nonlinear and time-varying. A modified Bolza performance index is employed. The optimization is formulated as a multiple-arc problem of the calculus of variations. Necessary conditions for optimal control are given in the form of a nonlinear two-point boundary value problem. The method of steepest descent is applied to obtain numerical solutions. A computational procedure is found which is especially suited to this type of problem. Special features of the procedure are automatic step size adjustment, and the generation of a sequence of performance indices which is monotonic. Examples which illustrate the range of application are given. (Author)

AD-618 331 Div. 8/2, 8/7
CFSTI Prices: HC$1.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
ON THE GENERALITY OF SWITCHING NETWORKS WITH RESTRICTED NON-LINEARITY,
by A. C. McKellar. Jul 65, 15p Rept. no. R-258
Contract DA28 043AMC00073E; Grant NSF GK36
Proj. 20014501B31F
Unclassified report

Descriptors: (*Switching circuits, Nonlinear systems), Sequence switches, Feedback, Synchronizing switches, Computer logic, Communication theory.

The generality of special types of asynchronous realizations of sequential machines is considered and compared with the synchronous case. It is shown that linear asynchronous networks are essentially combinational. On the other hand, every sequential machine can be realized as a network whose output and feedback functions are linear in the feedback inputs. It is proven that more feedback loops are required to do this than are required by known synchronous realizations. A relationship is established between asynchronous networks which are quadratic in their feedback inputs and synchronous networks which are linear in their feedback inputs. (Author)

AD-618 332 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
OPTIMAL CONTROL OF LINEAR SYSTEMS WITH TIME LAG.
Doctoral thesis,
by Thomas Edwin Mueller. Jun 65, 47p
Rept. no. R-254
Contract DA28 043AMC00073E, Proj. 20014501B31F
Unclassified report

Descriptors: (*Optimization, Control systems), (*Time-lag theory, Control), Linear systems, Differential equations, Difference equations, Integral equations.

New results are given which permit a numerical solution of the optimal regulator problem for systems governed by linear differential-difference equations in which the optimization interval is finite. An iterative algorithm which assures convergence to the optimum is derived from the necessary and sufficient conditions for optimality. This algorithm requires neither the choice of an initial control nor the choice of a convergence parameter. The conditions for optimality are derived in two forms: an integral equation and a coupled set of differential-difference equations. Numerical examples for this are presented. (Author)

AD-618 333 Div. 8/2, 8/7
CFSTI Prices: HC$2.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
A PROCEDURE FOR SYNTHESIS OF SWITCHING NETWORKS.
Doctoral thesis,
by Archie Charles McKellar. May 65, 47p
Rept. no. R-253
Contract DA28 043AMC00073E; Grant NSF Gk36
Unclassified report

Descriptors: (*Switching circuits, Synthesis), Sequence switches, Feedback, Iterative methods, Communication theory.

A procedure is described which yields a realization of a sequential machine as any asynchronous switching network. The basic idea is to perform an operation on the flow table which corresponds to opening a feedback loop of some realization. Repetition of such operations leads to the specification of a combinational network which is considered to be a solution to the problem. In addition to being iterative, the procedure is capable to being implemented on a digital computer. Necessary and sufficient conditions for the existence of asynchronous cascade and parallel realizations are given and methods of obtaining such realizations are explored. It is shown that the steady state behaviour of a sequential machine is useful in this regard. (Author)

AD-618 340 Div. 8/7

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
DETERMINATION OF OPTIMUM NONLINEAR SYSTEMS FOR GENERALIZED ERROR CRITERIA BASED ON THE USE OF GATE FUNCTIONS,
by Martin Schetzen. 21 May 64, 9p
Contract DA36 039AMC03200E; Grant NSF GP2495
Unclassified report

Pub. in I E E E Transactions on Information Theory vIT11 n1 p117-25 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Optimization, Non-linear systems), Determination, Errors, Communication theory, Probability, Statistical functions.

A generalization of the error criteria in the analysis of optimum nonlinear systems is presented. The experimental and analytical techniques presented are based upon the expansion of the nonlinear system in the orthogonal set of gate functions that were introduced into the study of nonlinear systems by Bose in 1956. It is shown that, for various error criteria, the coefficients in the expansion can be determined independently of each other. By making use of this result, methods are developed for the determination of nonlinear systems with and without memory, for which an arbitrary weighted function of the error or the probability of an arbitrary function of the error is a minimum. (Author)

AD-618 341 Div. 8/3, 8/7

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
THE SUBJECTIVE EFFECT OF TWO-DIMENSIONAL PICTORIAL NOISE,
by Thomas S. Huang. 22 May 64, 11p
Contract DA36 039AMC03200E; Grant NSF GP2495
Unclassified report

Pub. in I E E E Transactions on Information Theory vIT11 n1 p43-53 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Video signals, Noise(Radio)), (*Pictures, Television display systems), (*Visibility, Pictures), Communication theory, Interference, Wave transmission.

A study has been made of the subjective effects of the class of independent additive rectangular low-pass Gaussian noises. Three original pictures, varying in the amount of detail, were used. The general shapes of the isopreference surfaces in sigma - k sub 1 - k sub 2 space where sigma is the rms value, and k sub 1 and k sub 2 are the bandwidths of the noise in the horizontal and vertical directions, respectively, were found. If the objectionability of noise is a linear functional of the noise spectrum, then one may deduce that for the class of noises whose spectra are symmetrical with respect to both horizontal and vertical frequencies, the weighting function in the integral representing noise objectionability is similar in shape to these isopreference surfaces. (Author)

AD-618 359 Div. 30/2
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
NOSY: A CORE-SAVING OPERATING SYSTEM,
by Ivan L. Finkle and H. L. Scantlin. Jul 65, 11p
Rept. no. P-3168
Unclassified report

Descriptors: (*Programming(Computers), Systems engineering), (*Computer storage devices, Optimization), Coding, Programming languages, Input-output devices, Data storage systems, Design, Computer operators.

NOSY is a four-phase system: (1) Conversion of BCD input tape to binary tape; (2) Loading and preparation of absolute binary tape; (3) Execution; (4) Output (conversion of binary tape to BCD output). IBSYS is purged from core during the execution phase only. This is the main purpose of the system. Also during the execution phase, the 7040 and 7044 are virtually disconnected, so that the 7040 will eventually hang up, waiting for the 7044 to assign the next 7040 task. This signal cannot be sent until the output phase, when IBSYS is back in core. (Author)

AD-618 370 Div. 8/1
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
A NONRECIPROCAL CIRCULAR POLARIZER,
Interim rept.,
by M. L. Reuss. 17 Jun 65, 12p Rept. no. NRL-6254
Proj. SR008 03 02 9637
Unclassified report

Descriptors: (*Waveguide circulators, Polarization), Microwave equipment, Antenna components, Standing wave ratios, Ferromagnetic materials, Radar antennas.

A nonreciprocal circular polarizer has been developed. This ferrite device converts linear polarization propagating in rectangular waveguide into circular polarization propagating in circular waveguide. The sense, right- or left-hand, of the circular polarization is determined by the direction of a magnetic field applied to the ferrite. If one sense of circular polarization, e.g., right-hand, is transmitted, then only left-hand circular polarization can be received. Performance data indicate good ellipticity with reasonable loss and VSWR for two models of the circular polarizer, and for two devices - a circulator and a nonreciprocal antenna element - based on the polarizer. The antenna element permits one antenna to be used both to transmit and to receive the reflected circularly polarized signals from a target. (Author)

AD-618 381 Div. 8/1
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
PERMANENTLY MAGNETIZED FERRITE ANTENNA WINDOWS FOR IMPROVING ELECTROMAGNETIC WAVE TRANSMISSION THROUGH A PLASMA,
by Melvin J. Kofoid. Jun 65, 22p Rept. no. D1-82-0442
Unclassified report

Also available from the author.

Descriptors: (*Ferromagnetic materials, Antenna components), (*Wave transmission, Plasma sheath), (*Antennas, Reentry vehicles), Magnetic fields, Electromagnetic waves, Radio transmission, Magnets, Barium compounds, Oxides, Ferrites, Magnetic properties, Electromagnetic shielding, Electrical impedance, Blackout(Electromagnetic), Plasma medium.

A longitudinal magnetic field (Bsubz) can be employed to increase the transmission through a plasma of a right-hand polarized electromagnetic (EM) wave at below the natural plasma frequency. The Bsubz field can be produced by permanently magnetized ferrite material in the form of a thick sheet placed as a window in front of the radiator and directly adjacent to the plasma. The crucial point is that it has been shown by test that high-frequency EM waves can be transmitted with only reasonable attenuation through a thick sheet of ferrite which is producing a Bsubz > 1500 gauss longitudinal field at the sheet surface. Further, due to its rotational field-displacement properties, there exists the possibility that the magnetized ferrite sheet serving as the antenna window may be so constructed as to be simultaneously an isolator and thereby reduce the changes in load impedance seen by the radiator with varying plasma sheath conditions. (Author)

AD-618 385 Div. 8/4, 8/7
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
COUPLED-MODE ANALYSIS OF SPACE-CHARGE-WAVE PROPAGATION IN ACCELERATED ELECTRON BEAMS.
Technical rept.,
by Bruno Zotter. Apr 65, 19p Rept. no. ECOM-2580
Proj. 1P6 22001A055 04, Task 1P6 22001A055 04 00
Unclassified report

Descriptors: (*Electron beams, Acceleration), (*Space charges, Electron beams), (*Noise(Radio), Reduction), Propagation, Traveling-wave tubes, Potential theory, Diodes.

A coupled-mode analysis of signal and noise propagation on accelerated beams is discussed for two particular potential variations. The first case, which has been investigated by Haddad and Adair, assumes a d-c potential achievable only by the use of grids. A predicted noise reduction scheme using insertion of additional power into the fast space-charge-wave is shown to be rather limited. The second case discussed is the space-charge-limited diode region, and it is demonstrated that it does not show any noise reduction at all under the assumptions of the coupled-mode theory. (Author)

AD-618 386 Div. 8/2, 25/2, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
EVALUATION OF SINGLE-CRYSTAL PLANAR HEXAGONAL FERRITES FOR APPLICATION TO MICROWAVE DEVICES.
Technical rept.,
by Samuel Dixon, Jr., John Bruscella, Arthur Tauber, and Robert O. Savage. Apr 65, 25p Rept. no. ECOM-2585
Proj. 1P6 22001A055, Proj. 1P6 22001A055 04
Unclassified report

Descriptors: (*Microwave equipment, Ferrites), (*Ferrites, Single crystals), Barium compounds, Zinc compounds, Additives, Manganese, Magnetic resonance, Line spectrum, K band, Magnetic fields, Crystal growth, Heat treatment, Pumping(Electronics), Limiters, Ferrates.

To satisfy Army device requirements in radar, countermeasures, and satellite systems between 9 and 140 kMc, a wide variety of nonlinear, ferromagnetic components such as power limiters, tunable filters, and pulsed, ferromagnetic generators must be designed and constructed. Such devices, presently restricted because of an inherent frequency limitation or the prohibitively large d-c field requirement, demand a material with unique properties (high magnetic anisotropy) to permit efficient device operation with small, applied fields. After several years of research and development, single crystals of ZnY ($Ba_2Zn_2Fe_2O_3$), modified by substituted manganese, have yielded crystals with a resonance linewidth of 3.8 oersteds at 9.0 kMc and room temperature. This represents the lowest value reported for planar, hexagonal ferrites. From the observed threshold field, a spin-wave linewidth of 1.24 oersteds was calculated. An experimental subsidiary resonance limiter at 17.2 kMc was designed and its characteristics are being evaluated using Mn-ZnY crystals. At Ku-band frequencies and above, d-c magnetic field requirements are smaller for Mn-ZnY than for yttrium-iron-garnet, permitting a smaller, lighter device. (Author)

AD-618 387 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Labs., Fort Monmouth, N. J.
RELIABILITY OF PRINTED WIRING CORDWOOD MODULES,
by T. S. Gore and W. V. Lane. Mar 63, 16p
Unclassified report

Paper presented at the National Symposium on Reliability and Quality Control (9th), 23 Jan 63, San Francisco, Calif.

Descriptors: (*Modules(Electronics), Reliability-(Electronics)), (*Reliability(Electronics), Modules-(Electronics)), Printed circuits, Environmental tests, Life expectancy, Test methods, Encapsulation, Soldered joints.

It was concluded from the test results that the use of military standard components in encapsulated printed wiring cordwood modules using the construction techniques described in the paper can result in component reliability levels equal to or greater than the levels reported for similar components in a free-air environment.

AD-618 393 Div. 8/1
CFSTI Prices: HC$2.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
RADIOMETRIC FEED FOR HAYSTACK.
Technical note,
by A. Sotiropoulos. 15 Jun 65, 31p
Rept. no. TN-1965-23
Contract AF19 628 500
ESD TDR-65-237
Unclassified report

Descriptors: (*Antenna feeds, Microwave frequency), (*Antennas, Radio astronomy), Microwave equipment, S band, X band, K band, Radiofrequency power, Polarization, Gain.

This technical note describes a series of radiometric feeds in the 5.0 Gcps, 8.0 Gcps and 15.5 Gcps bands which were constructed and installed into the Haystack Cassegrain antenna system. Measured data are presented and also used to calculate the percentage of power intercepted by the subreflector and also the Cassegrain antenna aperture efficiency. (Author)

AD-618 396 Div. 8/1, 8/6, 12/1
CFSTI Prices: HC$2.00 MF$0.50

Sylvania Electronic Systems, Waltham, Mass.
Applied Research Lab.
PROPAGATION CONSTANT ALONG A CYLINDRICAL ANTENNA IMMERSED IN A WARM PLASMA. PARTS I AND II.
Scientific rept.,
by S. R. Seshadri and J. Galejs. Apr 65, 35p
Rept. no. S-3040-6, SR-6
Contract AF19 628 2410, Proj. 4642, Task 464202
AFCRL 65-371
Unclassified report

Descriptors: (*Satellite antennas, Plasma physics), (*Electromagnetic waves, Plasma medium), (*Plasma sheath, Satellite antennas), Cylindrical bodies, Antennas, Wave transmission, Propagation, Plasma oscillations, Transmission lines, Partial differential equations, Boundary value problems, Bessel functions, Excitation, Numerical analysis, Theory.

Part One of this report considers a lossless plasma. The propagation constant is shown to be close to that of the plasma mode in an unbounded plasma in the frequency range for which the electromagnetic (EM) and the plasma (P) space waves are excited, that is for frequencies above the plasma frequency. This applies to antennas without or with an insulating sheath. Part Two considers an insulated

antenna in a lossy plasma. A guided wave with a propagation constant close to that of the electromagnetic mode in an unbounded plasma is now possible in addition to the guided plasma wave, that is the only one which satisfies the radiation condition for a lossless plasma. It is, therefore, appropriate to include in the approximation for the current distribution along the antenna parts which have propagation constants of the order of magnitude of P and EM waves. (Author)

AD-618 397 Div. 8/1
CFSTI Prices: HC$2.00 MF$0.50

Sylvania Electronic Systems, Waltham, Mass. Applied Research Lab.
DRIVING POINT IMPEDANCE OF LINEAR ANTENNAS IN THE PRESENCE OF A STRATIFIED DIELECTRIC.
Scientific rept.,
by Janis Galejs. Apr 65, 35p
Rept. nos. SR-7; RR-445
Contract AF19 628 2410, Proj. 4642, Task 464202
AFCRL 65-372
Unclassified report

Descriptors: (*Antennas, Electrical impedance), (*Electrical impedance, Antennas), (*Dielectrics, Antennas), Laminates, Underground antennas, Resistance(Electrical), Slot antennas, Calculus of variations, Integrals.

A linear flat strip antenna lies between several dielectric layers in a direction parallel to the interfaces. Its impedance is formulated variationally as an infinite double integral. For thin half-wave antennas in a homogeneous medium the double integral is evaluated analytically and it gives standard impedance expressions. For antennas of finite width the integrals are evaluated numerically and for a homogeneous medium the impedance has been correlated with the theories of King and Middleton, Wu, with the impedance computed from a complementary slot antenna and with available measurements. The impedance is also computed for antennas in a dielectric layer, and the decrease of the radiation efficiency observed with increasing amounts of surface wave power and in part by local dielectric losses. For insulated antennas located in a dissipative medium the theory presented here yields results in better agreement with measurements than the conventional transmission line theory. The transmission line theory is shown to give too large a resistance and reactance at the full-wave resonant peaks of the impedance and too low a resistance for short antennas. (Author)

AD-618 402 Div. 8/1
CFSTI Prices: HC$3.00 MF$0.75

Airborne Instruments Lab., Inc., Deer Park, N. Y.
MILLIMETER AND SUBMILLIMETER COMPONENT DEVELOPMENT.
Quarterly rept. no. 3, Sep-Nov 64,
by J. J. Taub, J. Cohen, H. J. Hindin, G. Kurpis, and F. R. Arams. Jun 65, 53p
Contract AF30 602 3343, Proj. 5573, Task 557304
RADC TR-65-21
Unclassified report

See also AD-609 090.

Descriptors: (*Millimeter waves, Waveguides), (*Waveguides, Millimeter waves), Waveguide filters, Dielectrics, Magneto-optic effect, Electromagnetic shielding, Transmission lines, Mixers(Electronic), Rotation, Indium alloys, Antimony alloys, Semiconductors, Performance(Engineering), Quartz, Extremely high frequency, Cryogenics, Radiofrequency power, Band-pass filters.

Techniques for design of filters, ferrite devices, diode mounts, and radiation detectors in oversize waveguide are being investigated. Theoretical and experimental results are presented in this report. The 2 and 0.9 mm regions of the dielectric slab filters were evaluated. In addition, the effect of small-waveguide dissipation on the dielectric slab filters was derived. Experiments have continued on Faraday rotation in oversize waveguide. First measurements have been made at 1 mm. An isolator has been constructed. A new type of millimeter/submillimeter mixer using bulk semiconductor was analyzed and successfully demonstrated. The analysis was checked using a low-frequency-prototype consisting of a bolometric mixer operating at 1 Mc. Millimeter mixing was obtained in the 30 to 40 Gc region using bulk n-type indium antimonide as the mixer element. A conversion loss of 24.5 db was measured using nonoptimum material. When corrected for mismatch losses and other effects, a conversion loss of 15.5 db is calculated. (Author)

AD-618 412 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

TRG, Inc., Melville, N. Y.
DEVELOPMENT OF A LOW-NOISE MILLIMETER-WAVE PARAMETRIC AMPLIFIER.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 65,
by B. Albrecht, J. Kliphuis, and D. Neuf. Jul 65, 18p
Contract DA36 039AMC02365E, Proj. 1G6 22001A056
Unclassified report

See also AD-615 162.

Descriptors: (*Parametric amplifiers, Millimeter waves), (*Millimeter waves, Parametric amplifiers), (*Varactor diodes, Parametric amplifiers), Microwave amplifiers, Electrical impedance, Subminiature electronic equipment, Extremely high frequency, Gain, Waveguide circulators, Circuits, Pumping(Electronics), Klystrons.

A gain of 20 db and a bandwidth of 50 Mc was obtained at 30 Gc from a scale model of the 94 Gc amplifier. Measurements performed at 90 Gc on the latest group of diodes received from USAECOM (designated Lost S-80B) indicate that their cut-off frequency at zero bias is greater than 300 Gc. Selected diodes from this group have been pumped at 120 Gc and appear suitable for use in the 90-Gc amplifier. (Author)

AD-618 417 Div. 8/2, 5/2
CFSTI Prices: HC$2.00 MF$0.50

Lenkurt Electric Co., Inc., San Carlos, Calif.
INTERCONNECTING GROUPS OA-7021(XW-1)/FCC-17, OA-7151(XW-1)/FCC-17 AND OA-7152(XW-1)/FCC-17 (SUPERGROUP INTERCONNECT PANELS).
Technical rept., phase A,
by Forrest N. Easley, Frank Hegarty, and T. R. Holmes.
1 Jul 65, 37p
Contract AF30 635 11188
RADC TDR-64-470 V1
Unclassified report

Descriptors: (*Multiplex, Radio communication systems), (*Modules, Radio communication systems), Telephone communication systems, Reliability(Electronics), Circuits, Magnetic cores, Band-pass filters, Design, Radiofrequency amplifiers.

A chronological summary is given of the design and development problems and a detailed theoretical discussion of the supergroup interconnect panel. The supergroup interconnect panel was designed and developed for insertion in the transmission path between the supergroup demultiplexer output of a given supergroup in the AN/FCC-17 terminal equipment and the supergroup multiplexer input of the same AN/FCC-17 terminal equipment or of a

given supergroup in a commercial 'L' multiplex system. One supergroup interconnect panel must be used for each direction of transmission of a 60-channel supergroup. The major design problems were encountered in designing the bandpass and band elimination filters. Difficulty was encountered in obtaining ferrite coil cores that possess proper temperature coefficients and acceptably high Q characteristics and which remain stable within acceptable limits at all specified ambient temperatures. Difficulty was also encountered in manufacturing a crystal for use in the band elimination filter circuit. Additionally, all filter circuits had to be temperature compensated to further enhance stability at extremely high or low temperatures. (Author)

AD-618 424 Div. 8/2, 5/2
CFSTI Prices: HC$2.00 MF$0.50

Lenkurt Electric Co., Inc., San Carlos, Calif.
INTERCONNECTING GROUPS 0A-7021(XW-1)/FCC-17, 0A-7151(XW-1)/FCC-17 AND 0A-7152(XW-1)/FCC-17 (SUPERGROUP INTERCONNECT PANELS).
Technical rept., phase B,
by Thomas F. Curry and T. R. Holmes. 1 Jul 65, 41p
Contract AF30 635 11188
RADC TDR-64-470 V2
Unclassified report

Descriptors: (*Multiplex, Radio communication systems), (*Modules(Electronic), Radio communication systems), Telephone communication systems, Reliability-(Electronics), Performance(Engineering), Attenuation, Electrical impedance.

This report contains a summary of the Category I testing of the supergroup interconnect panel, fabricated under the Phase B provisions of Contract AF30(635)-11188. The supergroup interconnect panel was designed and developed to interconnect a 60-channel supergroup between two AN/FCC-17 multiplexer sets, or between an AN/FCC-17 multiplexer set and a commercial 'L' multiplex system at the same terminal location. One supergroup interconnect panel is used for each direction of transmission of a 60-channel supergroup. The Category I testing phase of the supergroup interconnect panel development was accomplished to determine compliance with design requirements set forth in Lenkurt equipment specification 805-02737, and to evaluate equipment performance. After testing the equipment in accordance with the Category I Test Plan, it was concluded that the equipment is highly reliable, and is entirely within the specifications set forth in Lenkurt equipment specification 805-02737. (Author)

AD-618 431 Div. 30/2, 15/1

Pennsylvania Univ., Philadelphia.
THE TREATMENT OF AMBIGUITY AND PARADOX IN MECHANICAL LANGUAGES,
by Saul Gorn. 7 Apr 61, 19p
Contract AF49 638 951; Grant NSF G14096
Unclassified report

Research done in cooperation with Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia, Contract DA36 039SC74047.
Pub. in Proceedings of Symposia in Pure Mathematics v5 p201-18 1962 (Copies not available to DDC or Clearinghouse customers).
Another version is available from CFSTI, $3.60 as AD-259 782.

Descriptors: (*Programming languages, Analysis), (*Mathematical logic, Computers), Data processing systems, Coding, Theory, Computer logic, Sequences.

A summary is given of the basic definitions of the theory of mechanical languages, and of the main processors for the prefix languages. A discussion is given of language extension with the examples of hierarchies of extensions in prefix languages. The relationship is established between language extension and increase in control ambiguity. A language of syntactic ambiguity descriptions is designed and the effective processor translating from this language to the derived-language naming language is specified. The concepts of recognition depth for both syntactic ambiguities and analyzability of mechanical languages are developed, and examples are given to show the existence of both types at all depths, including infinite depth. Examples of control ambiguity are developed ranging from the extremely useful to the paradoxical. Among the paradoxes analyzed in this way are the Epimenides paradox, the Lewis Carroll Tortoise and Achilles paradox, and the Russell paradox. (Author)

AD-618 454 Div. 8/7

Lincoln Lab., Mass. Inst. of Tech., Lexington.
EVALUATION OF LIKELIHOOD FUNCTIONS FOR GAUSSIAN SIGNALS,
Revised ed.,
by Fred C. Schweppe. 16 Jul 64, 10p
Unclassified report

Pub. in IEEE Transactions on Information Theory vIT11 n1 p61-70 Jan 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 2 Apr 64.

Descriptors: (*Statistical functions, Signals), (*Communication theory, Signal-to-noise ratio), Communication systems, Multipath transmission, Statistical processes.

State variable techniques are used to derive new expressions for the likelihood function for Gaussian signals corrupted by additive Gaussian noise. The continuous time case is obtained as a limit of the discrete time case. The likelihood function is expressed in terms of the conditional expectation of the signal given only past and present observations, multipliers, and integrators (adders). Thus, the likelihood function can be generated in real time using a physically realizable system. Time-varying finite-dimensional Markov models are also discussed as they lead to a direct mechanization for the required conditional expectation. A simple example of a multipath communication system is discussed and an explicit mechanization indicated. (Author)

AD-618 456 Div. 8/7, 15/2

Lincoln Lab., Mass. Inst. of Tech., Lexington.
POWER SPECTRUM PARAMETER ESTIMATION.
Revised ed.,
by M. Joseph Levin. 21 Jul 64, 7p
Unclassified report

Pub. in IEEE Transactions on Information Theory vIT11 n1 p100-7 Jan 1965
Revision of manuscript submitted 11 Apr 63
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Stochastic processes, Communication theory), (*Communication theory, Stochastic processes), Fourier analysis, Series, Statistical functions, Radio astronomy.

The power spectrum of a zero-mean stationary Gaussian random process is assumed to be known except for one or more parameters which are to be estimated from an observation of the process during a finite time interval. The approximation is introduced that the coefficients of

the Fourier series expansion of a realization of long-time duration are uncorrelated. Based on this approximation maximum likelihood estimates are derived and fundamental limits on the variances attainable are found by evaluation of the Cramer-Rao lower bound. Parameters specifically considered are amplitude, center frequency, and frequency scale factor. Also considered is ripple frequency which refers to the cosine factor in the spectrum produced by the addition of a delayed replica of the random process. The dual problem of estimating parameters of the time-varying power level of a nonstationary band-limited white noise process is examined. (Author)

AD-618 471 Div. 7/2, 1/1
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
SOVIET AIRCRAFT CIRCUIT BREAKERS.
Annotated bibliography on surveys of Soviet-Bloc scientific and technical literature.
22 Jul 65, 22p Rept. no. ATD-B-65-54
TT 65-62675

Unclassified report

Descriptors: (*Circuit breakers, Aircraft equipment), USSR, Bibliographies, Abstracting, Electric relays, Electric switches, Control panels.

This report reviews Soviet literature on aircraft circuit breakers. It is based on Soviet open-source literature available at the Aerospace Technology Division and the Library of Congress. Material indirectly related to the assigned subject has been included because of its broad implications for study in this field. Articles dealing with relays and contactors are included since these devices are frequently used either alone or in combination to perform circuit-breaker operations. Articles dealing with generator control boxes, storage battery switching boxes, etc., with circuit breakers as components have also been included, along with patent listings (Author Certificates) of devices suitable for use in aircraft circuit-breaking systems. Available technical characteristics of the various devices cited in the bibliography are given. Contactors thermal circuit breakers, relays, and control boxes are listed.

AD-618 476 Div. 8/1, 6/6, 19/3
CFSTI Prices: HC$2.00 MF$0.50

Raytheon Co., Wayland, Mass.
ARSR QUINTUPLE ROTARY JOINT ASSEMBLY.
Final rept.,
by Ray H. Hyde. Jan 65, 30p
Contract FA WA4524, Proj. 242 002 02
SRDS RD-65-29

Unclassified report

Descriptors: (*Waveguide couplers, Rotation), (*Antenna components, Airport radar systems), L band, Radar antennas, Radar beacons, Joints, Couplings, Antenna feeds.

The ARSR Quintuple Rotary Joint provides the Federal Aviation Agency with a rotary joint assembly with sufficient capacity to allow the operation of radar beacon equipment using the center marking technique with the ARSR family of radars. The five channels provide two L-band joints for the ARSR: one for main radar and one for sidelobe cancellation; and three L-band joints for the ATCRBS beacon: one for normal beacon, one for center marking, and one for sidelobe cancellation. The design allows for the future incorporation of additional low and medium power joints as the FAA requirements grow. The rotary joint assembly is completely, simply, and continuously interchangeable between the ARSR-1A and 1C type pedestal and the ARSR-2 type pedestal. An ARSR-1 type trial installation was both mechanically and electrically made at the Oklahoma City ARSR-1D radar site with complete success. The environmental tests were successfully made with the Quintuple Rotary Joint Assembly installed in an ARSR-2 pedestal proving both mechanical and electrical compliance with the specification in this type of antenna pedestal. (Author)

AD-618 488 Div. 8/2, 26/1
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., Lynchburg, Va. Communication Products Dept.
MICROMINIATURE CRYSTAL UNITS CR-(XM-47)/U.
Quarterly rept. no. 7, 1 Feb-30 Apr 65,
by John H. Sherman, Jr. 30 Apr 65, 12p
Contract DA36 039AMC02232E, Proj. 1P622001A058

Unclassified report

See also AD-613 292.

Descriptors: (*Crystal holders, Microminiaturization-(Electronics)), (*Microminiaturization(Electronics), Crystal holders), Welding, Electron beams, Lasers, Seals(Stoppers), Electric terminals, Test methods, Dyes, Penetration.

The redesigned header has been produced successfully. A weld schedule appropriate to all of the known available triode-gun electron beam welders has been devised. Laser welding has been shown to be a practical technique of closure for these envelopes, but no installation of equipment fixtured suitable for crystal work has been assembled. (Author)

AD-618 490 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

Bliley Electric Co., Erie, Pa.
PRODUCTION ENGINEERING MEASURE CR-(XM-53)/U
QUARTZ CRYSTAL UNITS.
Quarterly rept. no. 2, Feb-Apr 65,
by J. M. Wolfskill, Merle George, and Robert Mouck.
Apr 65, 27p
Contract DA36 039AMC03640E

Unclassified report

See also AD-614 583.

Descriptors: (*Quartz resonators, Manufacturing methods), Crystal holders, Radiofrequency power, Performance(Engineering), Resistance(Electrical), Reliability(Electronics).

Accurate measurements of effective resistance were attained at the 2-microwatt drive level by making minor modifications to the TS-330(AGC) test set to permit it to function as a 'Transmission line' circuit. These more accurate measurements disclosed that there were problems in meeting the 1,000,000 Q at the 5-Mc level as well as at the 1-Mc level, where several mounting arrangements had been evaluated without success. The various mounting arrangements are described, as well as the current approaches which involve attainment of higher Q levels by the quartz resonators themselves, rather than complete dependence on the mounting arrangements. (Author)

AD-618 491 Div. 30/2, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Texas Instruments, Inc., Dallas.

FABRICATION AND TESTING OF CRYOGENIC ASSOCIATIVE PROCESSOR PLANES.
Final technical rept. for 5 May-13 Dec 64,
by J. Paul Pritchard, Jr. May 65, 60p
Rept. no. 08-65-11
Contract AF30 602 3423, Proj. 5581, Task 558109
RADC TR-65-74
Unclassified report

Descriptors: (*Computer storage devices, Thin films(Storage devices)), (*Thin films(Storage devices), Superconductors), Cryogenics, Data processing systems, Computer logic, Circuits.

Feasibility is established of a unique photomask-photoresist process for fabrication of a 120-bit, 2350-cryotron associative memory plane. A set of nine photomasks defines the five superconductive and four insulating material layers of the structure. The thin film circuitry occupies a 4 square inch area of a 2.4 inch x 2.4 inch glass substrate. Two hundred and fifty solder lands, 0.007 inch x 0.100 inch on 0.014 inch centers, are suitably grouped around the substrate perimeter for pressure contact with the data link. Seven short-free memory planes were successfully produced with intended signal path continuity, as established by dc tests at 300K and below 3.5K. Difficulties in simultaneously achieving superconductive pressure contact at all solder lands precluded memory operation; however, current loop switching and trapping were demonstrated for accessible cryotron circuit segments. Solutions to this unanticipated interconnection problem were subsequently conceived and demonstrated. (Author)

AD-618 496 Div. 8/2
CFSTI Prices: HC$3.00 MF$0.75

Shockley Transistor Div., Clevite Transistor, Palo Alto, Calif.
RESEARCH ON SOLID STATE NOISE DEVICES.
Final rept. for 13 Jun 62-30 Jun 65,
by David Farrington. 30 Jun 65, 57p
Contract DA49 186ORD1086, Proj. 96395
Unclassified report

See also AD-607 231.

Descriptors: (*Semiconductor devices, Noise(Radio)), (*Avalanche diodes, Noise generators), (*Noise generators, Avalanche diodes), Silicon, Low frequency, Voltage, Performance(Engineering).

This report is concerned with an experimental investigation of a silicon noise diode having an avalanche breakdown voltage of approximately 12 volts and capable of producing high amplitude white noise over the frequency range 40 kc to 200 kc. The influence of the device parameters on the performance of completed devices from many independent diffusions is examined. A study of the design of a noise generator with high pulse rate is presented. (Author)

AD-618 526 Div. 8/2

Keystone Controls Corp., Newark, N. J.
CRYSTAL UNIT CR-(XM-28)/U.
Special rept.
by James M. Ronan. 1964, 11p
Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public use.
See also AD-609 007.

Descriptors: (*Crystal holders, Aging(Materials)), Frequency shift, Encapsulation, Glass, Metals, Crystals, Bonding, High frequency, Performance-(Engineering).

A study was made of the comparative aging rates of glass vs. metal enclosed units. The intent was to establish, if possible, the contributing factors related to crystal unit aging. Control groups were divided so that identifical groups were enclosed in both glass and metal, using various types of mounting clips and bonding cements. The units were aged at 85C. All units were 30mc units. Because of the complexity involved in the design of a system to accomplish the measurements at this frequency, the units were measured at their fundamental frequency of 10.0 mc/s.

AD-618 564 Div. 8/3
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
OPTIMUM BINARY FSK FOR TRANSMITTED REFERENCE SYSTEMS OVER RAYLEIGH FADING CHANNELS.
Physical sciences research papers,
by Neil J. Bershad. Jun 65, 29p
Rept. nos. AFCRL-65-441, PSRP-113
Proj. 4641, Task 464101
Unclassified report

Descriptors: (*Frequency shift keyers, Optimization), (*Diversity reception, Frequency shift keyers), Attenuation, Probability, Communication theory, Decision theory, Gain, Signal-to-noise ratio.

It is well known that in communicating over randomly time-varying channels, a receiver which performs a channel measurement can make a better decision than one that does not. It is shown that a channel-measuring system improves system performance even when the channel characteristics are fixed only during the present message interval. The randomly time-varying channel studied is that of a Rayleigh fading medium with independently fading mark and space channels whose fading is fixed over one baud interval but is independent from baud to baud. The transmission system is a modified frequency shift keying (FSK) system such that during a portion of a baud interval the mark and space frequencies are always transmitted so as to act as reference signals. For the above system, the following characteristics have been established: (a) Optimum receiver configuration, (b) Optimum ratio alpha of information energy to total signal energy as a function of total available signal-to-noise ratio for a single fading channel, (c) Asymptotic optimum alpha for an M-diversity channel, (d) Error probabilities for (b) and asymptotic error probabilities for (c) for alpha opt as a function of total signal-to-noise ratio. The asymptotic results show that by using reference techniques the order of diversity is effectively doubled. (Author)

AD-618 567 Div. 30/2, 2/2
CFSTI Prices: HC$2.00 MF$0.50

Stanford Research Inst., Menlo Park, Calif.
GRAPHICAL DATA PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Quarterly progress rept. no. 7, 1 Jan-30 Apr 65,
by Alfred E. Brain and John H. Munson. May 65, 38p
Rept. no. 19
Contract DA36 039AMC03247E, Projs. 4565, IF20401A327 02 01 Unclassified report

Continuation of Contract DA 36-039-SC-78343.

Descriptors: (*Data processing systems, Graphics), (*Pattern recognition, Maps), Analog-digital computers, Computer storage devices, Programming(Computers).

A calculation was made of the positional errors arising from the simple plano-convex lens used as a collimator in the optical preprocessor. The performance is fully adequate to satisfy the demands of the present application. An extensive experimental investigation was carried out on hand-drawn military map symbols. 405 slides were prepared and read by the 100-image preprocessor on three separate days, the intermediate 100-bit code word being recorded from the ternary buffer onto paper tape. A total of 3240 code words were recorded, and subsequent training and analysis tests were made via the tape rather than the preprocessor. A program simulating MINOS II was run in parallel to provide for comparing the results that would have been given by MINOS II if it had been operating perfectly. The following conclusions were drawn: (1) the reproducibility of the observed behavior was sufficient to yield meaningful results, (2) the data base was still too small for the training data to be fully representative of the test data, and (3) the particular choice of output codes had a substantial influence on the difficulty of training to a low error rate. (Author)

AD-618 643 Div. 30/2, 30/5
CFSTI Prices: HC$2.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
MACHINES THAT CAN LEARN TO RECOGNIZE PATTERNS,
by V. A. Yakubovich. 21 May 65, 48p
Rept. no. FTD-TT-65-148
TT 65-62707

Unclassified report

Unedited rough draft trans. of Metody Vychislenii (USSR). n2 p95-131 1963.

Descriptors: (*Pattern recognition, Computer logic), (*Artificial intelligence, Pattern recognition), (*Computer logic, Pattern recognition), Bionics, Cybernetics, Computers, USSR.

This translation discusses machines that in some sense simulate the work of that part of the cerebral cortex that supervises organization of impressions and processes the elementary ideas associated with the process of pattern recognition.

AD-618 650 Div. 8/3
CFSTI Prices: HC$2.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
PROBLEM OF SYNCHRONIZATION OF DYNAMIC SYSTEMS,
by I. I. Blekhman. 1 Jun 65, 46p
Rept. no. FTD-MT-65-12
TT 65-62714

Unclassified report

Edited machine trans. of Prikladnaya Matematika i Mekhanika (USSR) v28 n2 p193-215 1964.

Descriptors: (*Synchronization(Electronics), Dynamics), Theory, Oscillators, Vibrators(Mechanical), Mathematical analysis, USSR.

It is noted that synchronization constitutes a phenomenon observed in the behavior of both artificially created and natural objects, e.g., electrical and vacuum-tube oscillators, mechanical vibrators, pendulum clocks, musical instruments, and certain biological systems. A general formulation is made of the problem of synchronization of dynamic objects and its peculiarities are examined. The basis specific problems and applications are enumerated. Mathematical apparatus is indicated which is useful for studying a basic class of problems of synchronization, i.e., problems concerning the coordinated functioning of several almost identical self-oscillation objects weakly interacting with one another. The observed tendency of such objects of the most varied nature to synchronous movements finds its own mathematical expression in the fact that a defined system of differential equations with periodic coefficients, as a rule, allows stable periodic solutions. A short survey of works on the theory of synchronization of dynamic systems is presented and problems yet unsolved are enumerated. (Author)

AD-618 686 Div. 8/7, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Rome Air Development Center, Griffiss AFB, N. Y.
CYBEC - A GENERAL PURPOSE BURST ERROR CORRECTOR,
Final rept.,
by Walter R. Richard. May 65, 54p
Rept. no. RADC-TR-65-158
Proj. DU63 38

Unclassified report

Descriptors: (*Coding, Errors), Corrections, Communication theory, Digital systems, Communication systems, Feedback, Decoding.

A general purpose error correction device has been constructed for use in digital communications evaluations. It uses cyclic burst error correction coding techniques. The device is designed and constructed to allow easy changing of the cyclic code to be used. The coder and decoder are easily programmed by means of a series of plugs and switches to use any burst error correcting code with a total block length of 63 bits or less, and with 19 or less check bits per block of data. The ratio of redundancy to information is easily varied. These coding constraints will allow correcting error bursts of up to nine bits in length. This report describes the construction details of the equipment in a form easily understood by an engineer with little background in coding theory. The report also presents a list of 22 codes which are easily programmed into the equipment. (Author)

10. Energy Conversion (Non-propulsive)

AD-618 016 Div. 7/6, 7/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
TEN TIMES MORE POWERFUL THAN THE 'ROMASHKA',
by Yu. Berezhnoi. 13 Jul 65, 6p
Rept. no. FTD-TT-65-758
TT 65-62628
Unclassified report

Unedited rough draft trans. from an unidentified 1964 or 1965 issue of Sovetskaya Rossiya (USSR).

Descriptors: (*Thermal batteries, Energy conversion), (*Energy conversion, Thermal batteries), Semiconductors, Thermocouples, Thermoelectricity, Electric power production, Heat, USSR.

AD-618 037 Div. 7/6, 7/5
CFSTI Prices: HC$1.00 MF$0.50

Minnesota Mining and Mfg., Co., St. Paul.
300 WATT PORTABLE THERMOELECTRIC GENERATOR.
Monthly progress rept. no. 9, for period ending Jun 65,
by R. D. Carlton. 30 Jun 65, 5p
Contract N600 61533 62758
Unclassified report

See also AD-612 602.

Descriptors: (*Thermoelectricity, Power supplies), (*Generators, Thermoelectricity), (*Electric power production, Thermoelectricity), Portable, Thermocouples, Performance(Engineering), Heat exchangers, Heat conversion.

Over 1000 hours of stable performance has been accumulated on a 5-couple test module. A 9-couple module has verified the predicted electrical and thermal performance of the thermopile design.

AD-618 071 Div. 7/6, 7/5, 8/3, 25/3
CFSTI Prices: HC$2.00 MF$0.50

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
RESEARCH ON NEW CONCEPTS IN ENERGY CONVERSION.
Quarterly technical progress rept. no. 7, 1 Mar-31 May 65,
by W. D. Jackson, G. A. Brown, J. L. Kerrebrock, and R. E. Stickney. 15 Jun 65, 36p
Contract AF33 615 1083, Proj. 8173, Task 817306
Unclassified report

Descriptors: (*Energy conversion, Magnetohydrodynamics), (*Magnetohydrodynamics, Power supplies), (*Thermionic converters, Materials), Generators, Liquid metals, Alkali metals, Electric propulsion, Thermionic emission, Transport properties, Jet pumps, Turbulence, Fluid mechanics.

Contents: Magnetohydrodynamic power generation with liquid metals; Liquid-metal magnetohydrodynamic generators; Magnetohydrodynamic channel flow; Systems with alkali-metal vapor generators; Thermionic emission from a tungsten crystal; Bonding mechanism of alkali-metal atoms adsorbed on metal surfaces; Volume ionization mechanisms in thermionic diodes; Condensing ejector test facility; Boundary-layer analysis of turbulent magnetohydrodynamic channel flows; Preliminary experimental results on an MHD induction generator; Thermionic characteristics of the (110) and (112) directions of tungsten in cesium vapor.

AD-618 255 Div. 7/6, 7/1, 4/4

Defence Chemical Biological and Radiation Labs., Ottawa (Ontario).
EFFECTS OF FOREIGN IONS ON NICKEL HYDROXIDE AND CADMIUM ELECTRODES.
Revised ed.,
by E. J. Casey, A. R. Dubois, P. E. Lake, and W. J. Moroz. 15 Dec 64, 14p Rept. no. DCBRL-453
Unclassified report

Pub. in Journal of the Electrochemical Society v112 n4 p371-83 Apr 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 11 Dec 61.

Descriptors: (*Alkaline cells, Electrodes), (*Electrodes, Impurities), (*Nickel compounds, Hydroxides), (*Cadmium, Electrodes), Nickel, Electrolytes, Potassium compounds, Carbonates, Contamination, Complex compounds, Nitrates, Oxidation, Ions, Lithium, Silver, Antimony, Aluminum, Arsenic, Canada.

The bahavior of individual positive and negative electrodes of the sintered-plate nickel-cadmium battery system in the presence of foreign ions in KOH solutions was examined. Carbonate choke: The variation of electrochemical capacity as a function of carbonate contamination of the electrolyte, temperature, and current density was measured for both positive and negative electrodes. The effect of carbonate on the negative cadmium electrode is much greater than on the positive. The general mechanism and the role of intermediate complexes are discussed. Nitrate shuttle: Self-discharge occurs in cells containing nitrate, as a result of reduction of NO3(-) to NO2(-) at the cadmium electrode with subsequent reoxidation to NO3(-) at the nickel hydroxide electrode. Cations on the positive: Addition of Li(+), Ag(+), Sb(+3), Al(+3), and As(+3) to the electrolyte had effects on capacity and on charge-retention of well-formed nickel hydroxide positive electrodes. Lithium promoted the highest average oxidation, particularly at high temperatures (55C). Arsenic was the best inhibitor of loss of charge. Possible mechanisms are discussed. (Author)

AD-618 461 Div. 7/6, 7/5

Lincoln Lab., Mass. Inst. of Tech., Lexington.
GALVANO-THERMOMAGNETIC PHENOMENA AND THE FIGURE OF MERIT IN BISMATH-I. TRANSPORT PROPERTIES OF INTRINSIC MATERIAL,
by T. C. Harman, J. M. Honig, and B. M. Tarmy.
19 Jun 64, 20p
Unclassified report

Pub. in Advanced Energy Conversion v5 p1-19 1965 (Copies available only to DDC users).

Descriptors: (*Transport properties, Bismuth), (*Bismuth, Energy conversion), Integral equations, Resistance(Electrical), Thermal conductivity, Magnetic properties.

Transport theory based on the relaxation time formalism has been applied to bismuth; the results are used in Part II of this paper to determine the figure of merit of Bi in energy conversion processes. Using the Jones-Shoenberg model for bismuth, analytic expressions have been derived for the electrical resistivity, thermal conductivity, and for the Hall, Seebeck and Nernst coefficients. The Boltzmann

transport equation was solved for the perturbed distribution function using anisotropic relaxation times. The result was then introduced in the transport integrals for the electric current and for energy flux to obtain the phenomenological equations for each set of charge carriers associated with a given ellipsoid. The contributions of each group of carriers were then added in the common symmetry coordinate system of the crystal to obtain the above-mentioned transport coefficients. To derive analytic expressions, it was necessary to consider the special cases where the magnetic field is aligned with each of the three symmetry axes and to pass to the limit of very low or very high magnetic fields. (Author)

AD-618 470 Div. 7/6, 7/5
CFSTI Prices: HC$3.00 MF$0.75

Radio Corp. of America, Camden, N. J.
A STUDY OF LOW-OUTPUT-VOLTAGE CONVERSION AND REGULATION TECHNIQUES.
Final rept.,
by R. Kisko and W. Needs. Jun 65, 68p
Rept. no. CR-65-595-1
Contract AF30 602 3518, Proj. 4519, Task 451901
RADC TR-65-126 Unclassified report

Descriptors: (*Power supplies, Direct current), (*Energy conversion, Feasibility studies), (*Direct current, Energy conversion), Reviews, Transistors, Rectifiers, Hall effect, Generators, Voltage, Tunnel diodes, Circuits, Reduction, Voltage regulators.

The report describes the results of a study conducted to determine the state of the art of DC bias power supplies with high regulation and fractional output voltages. The availability of fractional-output-voltage power supplies was determined by a survey of literature and a canvass of power supply manufacturers. The effort revealed that none was available. A study was then undertaken to determine the feasibility of producing such devices with high output current and high efficiency. Three methods were studied: the transistor-rectifier technique, the transformed-diode technique, and the use of unconventional generators based on the Hall effect. The results indicate that the first method is completely feasible, the second is completely infeasible, and the third has potential, but requires further investigation. (Author)

AD-618 479 Div. 7/6, 7/1, 4/2
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
A METHOD FOR THE QUANTITATIVE ANALYSIS OF THE SILVER OXIDE CATHODE.
Final rept.,
by Regina D. Wagner. 23 Jun 65, 23p
Rept. no. NOLTR-64-214
Proj. 3E000F008 06 02, Task RUT03E000 2121F008 06 02
Unclassified report

Descriptors: (*Alkaline cells, Electrodes), (*Cathodes(Electrolytic cells), Oxides), (*Silver compounds, Quantitative analysis), (*Oxides, Electrochemistry), Silver, Primary cells, Storage batteries, Oxidation, Zinc.

A method was developed to quantitatively analyze mixtures of the silver oxides and silver metal such as occur in the silver oxide cathode of primary and secondary alkaline silver-zinc batteries. The detailed procedure is given and data verifying its accuracy presented. The occurrence of a reaction between argentic oxide and silver metal is also verified. (Author)

AD-618 497 Div. 7/1
CFSTI Prices: HC$2.00 MF$0.50

Eagle-Picher, Co., Joplin, Mo. Couples Dept.
INVESTIGATIONS LEADING TO THE DESIGN AND DEVELOPMENT OF MAGNESIUM/MAGNESIUM PERCHLORATE BATTERIES.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 65,
by James Sharpe. 30 Apr 65, 37p
Rept. no. EPP-58274
Contract DA28 043AMC00221E, Proj. 1G622001A053, Tasks 1G6 22001A05302, 1G6 22001A05316
Unclassified report

See also AD-615 342.

Descriptors: (*Storage batteries, Magnesium), (*Magnesium, Storage batteries), Magnesium compounds, Perchlorates, Electrolytes, Mercury compounds, Oxides, Voltage, Corrosion, Chromates, Lithium compounds, Anodes(Electrolytic cell), Cathodes-(Electrolytic cell), Temperature.

The magnesium/magnesium perchlorate/mercuric oxide battery system exhibited good capacity and voltage tolerance for most of the discharge rates at +75F. Low temperature and high temperature studies of these batteries, conducted at the same discharge rates, demonstrated that this system operates at high efficiency over a temperature range of 40F to +125F. An activated stand of one week with less than 10% capacity loss can be expected from a mercuric oxide cell utilizing AZ 31. (Author)

11. Materials

AD-617 930 Div. 14/4
CFSTI Prices: HC$1.00 MF$0.50

Prodesco, Inc., Perkasie, Pa.
WOVEN MESH FROM BRAIDED NYLON CORD.
Rept. for 1 Jan-1 Jul 64,
by H. C. Brockman, J. C. McGrath, and J. H. Ross.
Apr 65, 22p
Contract AF33 657 12257, Proj. 5708
ML TR-64-413

Unclassified report

Descriptors: (*Nylon, Textiles), (*Weaving, Nylon), Cordage, Parachute fabrics, Fibers, Fibers(Synthetic), Tentile properties, Porosity, Permeability.

The objective of this program was to develop a woven mesh material using MIL-C-5040, Type I cord and commercial grade, high tenacity nylon yarn in order to achieve a 1000-1200 lb./in. breaking strength in the warp and filling directions and a geometric porosity of 35%, or a permeability of 800-900 cu.ft./sq.ft./min. Binder yarns from 30 denier to 200 denier were evaluated in order to achieve the strongest possible bond between warp and filling cords. Various constructions, ranging from 7 ends and picks of cord to 9 ends and picks of cord, were evaluated to achieve the optimum combination of breaking strength and air permeability. Unusual problems were encountered in weaving the cord because of its bulk and stiffness. Considerable yardage would have to be manufactured in order to determine the commercial practicality of the manufacturing technique. This study demonstrated the feasibility of designing and weaving a fabric using a 100 lb. breaking strength cord in a crimpless weave for use in special types of parachute applications. (Author)

AD-617 940 Div. 14/2, 2/8
CFSTI Prices: HC$3.00 MF$0.50

Michigan Univ., Ann Arbor. Coll. of Engineering.
THE KINETICS OF THE TRANSFORMATION OF QUARTZ TO TRIDYMITE IN THE PRESENCE OF OTHER OXIDES.
Technical rept. (Doctoral thesis),
by Gerald I. Madden. Jun 65, 70p
Rept. no. 05612-2-T
Contract Nonr122447, Proj. 05612

Unclassified report

Descriptors: (*Silicon compounds, Dioxides), (*Quartz, Transformations), Phase studies, Sodium compounds, Lead compounds, Iron compounds, Copper compounds, Oxides, Reaction kinetics, Crystal growth, Glass, Refractory materials.

The investigation is concerned with the kinetics of the transformation of quartz to tridymite, two of the polymorphs of silica (SiO2). The transformation was studied by heating quartz in the presence of other oxides in the temperature and composition range of tridymite stability. The systems studied were: Na2O-SiO2, PbO -SiO2, FeO -SiO2, and Cu2O-SiO2. The formation of cristobalite as an intermediate metastable phase in the tridymite stability range was reconfirmed. The reaction proceeds slowly at temperatures near the upper range of tridymite stability. As the firing temperature is decreased the rate is increased until a maximum is reached. Below this point the rate again decreases. A semilogarithmic plot of time versus temperature gives a C-curve. The rate of transformation was shown to be dependent on the amount of liquid present and the type of oxide added to the original quartz. As the amount of liquid is increased the rate of transformation is increased. The rate of transformation is affected by the type of liquid as follows: Na2O (fastest), PbO, FeO, Cu2O (slowest). An empirical relationship was developed to describe the kinetics of the transformation process.

AD-617 947 Div. 14/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
POLYORGANOSILOXANES. LIQUID BASE OF HIGH TEMPERATURE CONSISTENT OILS,
by E. M. Oparina, G. S. Tubyanskaya, and R. I. Kobzova. 30 Jun 65, 15p Rept. no. FTD-TT-65-322
TT 65-62621

Unclassified report

Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v9 n1 p32-8 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Lubricants, Siloxanes), (*Siloxanes, Lubricants), Oils, Heat-resistant materials, Stability, Oxidation, Wear resistance, Thermal properties, Viscosity, Chlorine compounds, Polymers, USSR.

A comparative characteristic is given of polyorganosiloxane liquids, offering an interest in role of liquid base of high temperature consistent lubs. Polymethylsiloxane liquids as components of lubs, intended for operation at a temperature of 200C, have the advantage in comparison with polyethylsiloxane liquid (physico-chemical properties, thermooxidation stability, antiwear properties) and with polymethylphenylsiloxanes (viscosity-temperature and antiwear properties). For silicon lubs, intended for operation at a temperature of above 200C, polymethylphenyl and polymethyl chlorophenylsiloxanes are recommended. (Author)

AD-618 005 Div. 17/2, 25/2

Massachusetts Inst. of Tech., Cambridge.
A TERNARY ALLOY WITH PbCl2-TYPE STRUCTURE: TiNiSi(E),
by Clara Brink Shoemaker and David P. Shoemaker.
29 Jul 64, 6p
AROD 3259:6

Unclassified report

Pub. in Acta Crystallographica v18 pt5 p900-5 May 1965 (Copies available only to DDC users).

Descriptors: (*Alloys, Crystal structure), (*Crystal structure, Alloys), (*Intermetallic compounds, Crystal structure), Titanium alloys, Nickel alloys, Silicon alloys, Single crystals, Crystal lattices, Symmetry-(Crystallography).

Beck and coworkers have found E phases in several ternary systems of transition elements with either silicon or germanium at the composition 1:1:1. The crystal structure of TiNiSi(E) has been determined and refined by least squares with (limited) three-dimensional single-crystal data to a final R value of 0.086 (excluding 002 due to apparent extinction, and all non-observed reflexions). The lattice parameters for the primitive orthorhombic cell are: a sub 0 = 6.1484±0.0012, b sub 0 = 7.0173±0.0014, c sub 0 = 3.6698±0.0007 A. The E phase is isotypic with PbCl2(C23), space group Pnam. All near-neighbor distances are within 0.06 A of the following average values: Ti-Ti 3.18, Ti-Ni 2.83, Ti-Si 2.61, Ni-Ni 2.67, Ni-Si 2.33 A. The numbers of near-neighbors are compared with those in Co2Si, theta - Ni2Si and U3Si2. (Author)

AD-618 008 Div. 17/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INVESTIGATION OF LIMIT VALUES OF ACTIVATION ENERGY OF CREEP OF TITANIUM-ZIRCONIUM ALLOYS,
by K. A. Osipov and A. L. Sotnichenko. 9 Jul 65,
10p Rept. no. FTD-TT-65-88
TT 65-62631

Unclassified report

Unedited rough draft trans. of Issledovaniya po Zharoprochnym Splavam (USSR) v10 p27-31 1963.

Descriptors: (*Titanium alloys, Creep), (*Creep, Titanium alloys), (*Zirconium alloys, Creep), Stresses, Heat of activation, Transformations, USSR.

Analysis of the results makes it possible to conclude that in alloys of the system titanium - zirconium, in the state of alpha-modification, during creep, under the action of large applied stresses, the activated state corresponds in character to 'local polymorphous transformation.'

AD-618 009 Div. 14/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
METHOD OF OBTAINING THERMALLY STABLE MATERIALS,
by L. V. Pevzner and M. S. Akutin. 9 Jul 65, 5p
Rept. no. FTD-TT-65-238
TT 65-62632

Unclassified report

Unedited rough draft trans. of Russian Patent 136 556, pub. 7 Jul 60, appl. no. 673003/23.

Descriptors: (*Heat-resistant materials, Composite materials), (*Composite materials, Heat-resistant materials), Patents, USSR, Polymers, Plastics, Metals, Vibration, Material forming, Surface-active substances, Casting.

The object of the invention is a method of obtaining heat-resistant materials on the basis of a union of polymers with metallic fillers. For the purpose of obtaining materials with improved heat resistance and mechanical strength, different dispersion metals as active or activated fillers are united with polycondensation or polymerization high-molecular compounds by the method of mechanochemical mixing in the process of vibration grinding or in special mixing machines with subsequent rolling. (Author)

AD-618 010 Div. 14/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF OXYGEN AND OXIDATION INITIATORS (HYDROPEROXIDE) ON ANTIWEAR AND ANTIFRICTION PROPERTIES OF POLYSILOXANES,
by G. V. Vinogradov, N. S. Nametkin, and M. I. Nosov.
6 Jul 65, 15p Rept. no. FTD-TT-65-315
TT 65-62633

Unclassified report

Unedited rough draft trans. of Neftekhimiya (USSR) v4 n3 p510-7 1964.

Descriptors: (*Siloxanes, Lubricants), (*Oxidation, Siloxanes), Oxidizers, Oxygen, Hydroperoxides, Lubrication, Wear resistance, USSR.

The effect of oxidizability of gaseous phase oxidation initiators (hydroperoxide of isopropylbenzene) and easily oxidizing hydrocarbon (4,4'-diisopropyldiphenylmethane) on the lubricity of polysiloxanes of various nature under heavy boundary friction conditions was investigated. Oxidizers produce a weak effect on the lubricity of polysiloxanes in comparison with what has been observed for petroleum oils, but the trend and direction of this effect in all instances is identical-oxidizers and easily oxidizing hydrocarbons delay the development of steel sticking, make it degenerated and promote its breaking away. The effect of oxidizers and easily oxidizing hydrocarbons on lubricity of polysiloxanes increases with a reduction in thermooxidizing stability of the latter. Antifriction properties of polysiloxanes are more sensitive in comparison with antiwear properties with respect to the gaseous phase and composition of lubricants. (Author)

AD-618 011 Div. 14/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON CERTAIN CHARACTERISTICS OF IRRADIATING LUBRICANTS WHEN STUDYING THEIR RADIATION RESISTANCE,
by Yu. S. Zaslavskii, A. D. Stukin, and G. I. Shor.
6 Jul 65, 11p Rept. no. FTD-TT-65-325
TT 65-62634

Unclassified report

Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v9 n10 p44-8 1964.
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Descriptors: (*Lubricants, Radiation damage), (*Neutron reactions, Lubricants), Radiation chemistry, Stability, USSR, Dosimeters, Absorption, Nuclear energy.

AD-618 012 Div. 17/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF CERTAIN ELEMENTS ON THE PLASTICITY OF NICKEL AT HIGHER TEMPERATURES (Vliyanie Nekotorykh Elementov na Plastichnost Nikelya pri Povyshennykh Temperaturakh),
by G. M. Volkogon and I. L. Rogelberg. 7 Jul 65,
11p Rept. no. FTD-TT-65-328
TT 65-62624

Unclassified report

Unedited rough draft trans. of Tsvetnye Metally (USSR) v37 n6 p66-71 1964.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Nickel alloys, Plasticity), USSR, Nickel, High-temperature research, Grain structures(Metallurgy), Additives.

The strongest modifying agent for nickel was found to be lithium: 0.1% Li (by batch) completely eliminates the zone of columnar crystals and reduces the size of the grain by approximately five times in comparison with unalloyed nickel. Additions of Ti, Ce, Ca, Zr, and Mg reduce the average dimension of grains by approximately two times and also cause over distribution of columnar zones and equiaxial crystals in the ingot. The remaining investigated additions cause no noticeable pulverization of the micrograin of the casted nickel structure. In this way, alloying of nickel with Mg, Ca, Sr, Ti, Zr, Hf, B, La, Ce, and Pr sharply raises plasticity at 400 -900°C. The surplus quantities of these elements (with exception of titanium) appear to be harmful and embrittle nickel. The

effect of the mentioned additions on plasticity of nickel is best explained on the basis of ideas concerning the binding of harmful admixtures into stable ones, into high melting compounds. The effect of surface active elements, such as boron, apparently, is connected with the change in grain boundary energy and with the prevention in this connection of the formation of solid (continuous) formations of low melting admixtures over the boundaries.

AD-618 040 Div. 14/8, 14/6, 20/3
CFSTI Prices: HC$3.00 MF$0.75

General Dynamics/Fort Worth, Tex. Nuclear Aerospace Research Facility.
EFFECTS OF NUCLEAR RADIATION AND VARIOUS ENVIRONMENTS ON A NUMBER OF SELECTED PLASTIC, GLASS-LAMINATE, AND CERAMOPLASTIC MATERIALS.
Rept. for 1 Oct 63-25 Mar 65,
by P. M. Johnson, J. H. Lewis, and M. R. Self.
Jul 65, 92p Rept. no. FZK-227
Contract AF29 601 6213, Proj. 6773, Task 677302
WL TR-65-40

Unclassified report

Descriptors: (*Plastics, Radiation damage), (*Composite materials, Radiation damage), (*Radiation damage, Plastics), (*Laminates, Radiation damage), Environmental tests, Polyester plastics, Films, Polyvinyl plastics, Acrylonitrile polymers, Styrene plastics, Glass textiles, Glass, Mica, Tensile properties, Hardness, Density.

Eight plastic materials were irradiated under various environmental conditions and subsequently tested to determine changes in tensile properties, hardness, and specific gravity. Merlon polycarbonate was irradiated to six gamma dose levels in air at 75F and two dose levels in a vacuum of approximately 3 x 10 to the minus 7th power torr. Plestar polycarbonate film was irradiated to six dose levels in air at 75F. The acrylonitrile-butadiene-styrene (ABS) plastics Kralastic MV and SRA received six doses in air at 75F, six doses in air at 240F, and two doses in vacuum. Kralastic SR and a glass-reinforced diallyl phthalate were irradiated to three dose levels in air at 75F and to two doses in vacuum. Supramica 500 ceramoplastic received three doses in air at 75 and 240F. Maximum gamma dose in air and in vacuum was 2 x 10 to the 11th power and 3.2 x 10 to the 10th power ergs/gm(C), respectively. Irradiations were performed with the Ground Test Reactor at the Nuclear Aerospace Research Facility. All materials except the poly(n-vinyl carbazole), diallyl phthalate, and ceramoplastic were severely damaged at the highest doses. (Author)

AD-618 088 Div. 17/6, 26/1
CFSTI Prices: HC$5.00 MF$1.25

Princeton Univ., N. J. Dept. of Aerospace and Mechanical Sciences.
EXPERIMENTS ON ANNEALED ALUMINUM,
by Marvin Jerry Kenig. 1965, 185p Rept. no. 737
Contract AF49 638 1306; Grant NSF GP579
AFOSR 65-0983

Unclassified report

Descriptors: (*Aluminum, Heat treatment), (*Heat treatment, Aluminum), (*Loading(Mechanics), Aluminum), Pipes, Stresses, Mathematical analysis, Strain-(Mechanics), Mechanical waves, Propagation, Deformation, Stability, Plasticity, Theory.

This investigation is a study of the quasi-static stress-strain relation for the case of biaxial stress in annealed commercially pure aluminum, and its implications with respect to the speed of propagation of disturbances caused by incremental stresses. Tubes of 1100 aluminum are subjected to combined tension and torsion loads. A very slow loading technique using very small load increments is employed. At the conclusion of static testing, specimens are subjected to torsional impulsive loading superimposed upon a biaxial prestress. The main points of this work are; all existing commonly used theories of plasticity in solid mechanics cannot possibly apply to mechanically unstable materials; and applying shock wave and Karman-Taylor theory to the experimentally determined quasi-static stress-strain curve for annealed 1100 aluminum accounts for all experimentally observed wave speeds for both fast and slow loading techniques without including strain rate effects.

AD-618 120 Div. 17/5, 17/2

Alberta Univ., Edmonton. Dept. of Mining and Metallurgy.
THE MARTENSITIC TRANSFORMATION IN PURE IRON,
by M. J. Bibby and J. Gordon Parr. 16 May 63, 6p
Grant DRB9535 16

Unclassified report

Pub. in Journal of The Iron and Steel Institute v202 p100-4 Feb 1964 (Copies available only to DDC users).

Descriptors: (*Transition temperature, Martensite), (*Iron, Martensite), (*Martensite, Iron), Transformations, Transition temperature, Metallography, Quenching-(Cooling), Carbon, Hardness, Phase studies.

High-rate quenching experiments have established that iron containing less than 0.0017%C transforms martensitically at 750C at cooling rates in excess of 35 000 degC/s. M(s) falls to 540C, and the critical quenching speed is lowered to 5 000 degC/s when the carbon content is increased to a figure between 0.005 and 0.01%. Two hypotheses are offered to rationalize the effect of carbon, and Crussard's shock-wave model of the martensitic transformation is extended. (Author)

AD-618 121 Div. 17/5, 17/2

Cities Service Athabasca, Inc., Edmonton (Alberta).
TRANSFORMATIONS IN IRON-NICKEL ALLOYS,
by W. D. Swanson and J. Gordon Parr. 16 May 63, 4p
Grant DRB9355 16

Unclassified report

Pub. in Journal of The Iron and Steel Institute v202 p104-6 Feb 1964 (Copies available only to DDC users). Research done in cooperation with Dept. of Mining and Metallurgy, Univ. of Alberta, Edmonton.

Descriptors: (*Transition temperature, Martensite), (*Iron alloys, Nickel alloys), (*Transformations, Iron alloys), Phase studies, Metallography, Quenching-(Cooling), Surface properties.

Cooling curves of Fe-Ni alloys (1-10%Ni) quenched at rates up to 60 000 degC/s, reveal two transformation mechanisms: the lower-temperature mechanism is shown, by the criterion of shape change, to be martensitic. The measured M(s) temperatures do not agree with the experiments or calculations of previous investigators. In all but the 10% alloy, the higher-temperature transformation (believed to be the 'massive' transformation) occurs about 50 degC above M(s). The critical cooling rate to produce a martensitic product decreases from about 30 000 degC/s in the 1%Ni alloy to 15 000 degC/s in the 7% alloy. (Author)

AD-618 132 Div. 17/2, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Illinois Inst. of Tech., Chicago.
SHORT-RANGE FORCES IN ALLOYS.
Summary rept.,
by Leonid V. Azaroff. 15 Jul 65, 7p
Contract Nonr140607, Proj. NR031 684
Unclassified report

See also AD-277 999.

Descriptors: (*Molecular association, Alloys), (*Alloys, Atomic structure), X-ray spectroscopy, Copper alloys, Nickel alloys, Aluminum alloys, Zinc alloys, Microstructure, Electrons.

The feasibility of using x-ray spectra to elucidate the phenomena accompanying alloying was established. The validity of the earlier analyses was reconfirmed and several alloy systems were investigated. All results obtained so far clearly indicate that it is possible to interpret the fine structure appearing near the main absorption edge of an atom in terms of the absorbing atom's electronic structure. Once the electronic structure is known, the nature of the interatomic bonds formed can be established and the detailed short-range forces adduced. The copper-rch solid-solution region of the copper-zinc system was examined in order to substantiate the new interpretative procedure which had been previously proposed.

AD-618 146 Div. 17/2, 25/3, 25/2

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Physics.
EQUIATOMIC TRANSITION METAL ALLOYS OF MANGANESE. IV. A NEUTRON DIFFRACTION STUDY OF MAGNETIC ORDERING IN THE PtMn PHASE,
by A. F. Andresen, A. Kjekshus, R. Mollerud, and W. B. Pearson. 24 Nov 64, 12p Rept. no. NRC-8469
Unclassified report

Pub. in Philosophical Magazine v11 n114 p1245-56 Jun 1965 (Copies available only to DDC users).

Descriptors: (*Manganese alloys, Transition elements), (*Magnetic properties, Manganese alloys), (*Neutron diffraction analysis, Magnetic properties), X-ray diffraction analysis, Phase studies, Crystal structure, Antiferromagnetism, Platinum alloys, Transition temperature.

From x-ray and neutron diffraction and magnetic susceptibility measurements, the PtMn phase with the CuAuI type structure is found to exhibit anti-ferromagnetic arrangement of the magnetic moments with spin quantum number 4/2 for the Mn atoms and 0 for the Pt atoms. The moments of nearest-neighbour Mn atoms in (001) planes are anti-parallel to each other, and the direction of the moments changes from parallel to c in alloys with 50 at. % Pt and less, to perpendicular to c with more than 50 at. % Pt. Neel temperatures are observed in the range from 840 to 970 K. At lower temperatures the alloys show weak ferromagnetism which is believed to result from canting of the moments. (Author)

AD-618 163 Div. 14/8, 4/4

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
THE USE OF FRICTIONAL COEFFICIENTS TO EVALUATE UNPERTURBED DIMENSIONS IN DILUTE POLYMER SOLUTIONS,
by J. M. G. Cowie and S. Bywater. Aug 64, 9p
Rept. no. NRC-8376
Unclassified report

Pub. in Polymer, The Chemistry, Physics and Technology of High Polymers v6 p197-204 1965. (Copies available only to DDC users).

Descriptors: (*Polymers, Molecular properties), (*Styrene plastics, Molecular properties), (*Acrylic resins, Molecular properties), Solutions, Friction, Numerical analysis, Canada.

It was shown that the unperturbed dimensions of polymer molecules can be estimated from a knowledge of the frictional coefficients in any given solvent. The method involves a graphical procedure based on a simple relation which is similar to an equation developed by Stockmayer and Fixman relating intrinsic viscosity and molecular weight. The method is tested experimentally using data obtained from dilute solution measurements on polystyrene and polymethylmethacrylate. (Author)

AD-618 164 Div. 17/5

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
INFLUENCE OF IMPURITIES ON THE OXIDATION OF Fe-26Cr ALLOYS,
by D. Caplan and M. Cohen. 1963, 4p
Rept. no. NRC-8357
Unclassified report

Pub. in Nature v205 n4972 p690 Feb 13 1965 (Copies available only to DDC users).

Descriptors: (*Iron alloys, Oxidation), (*Oxidation, Iron alloys), Chromium alloys, Impurities, Stainless steel, Manganese, Silicon, High-temperature research.

The report describes the high-temperature oxidation behaviour of three vacuum-melted alloys and one commercial steel. The results indicate that manganese is a deleterious additive to FeCr alloys from the point of view of high-temperature oxidation. The addition of 0.5 per cent silicon does not improve oxidation resistance. It would appear that the investigation of the pure alloys is not only useful for elucidation of the oxidation mechanisms but may also lead to the development of materials with higher oxidation resistance. This investigation indicates that the pure binary alloy is the most oxidation resistant.

AD-618 202 Div. 17/5, 25/2
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Dept. of Materials Science.
THE INFLUENCE OF STRAIN AND GRAIN SIZE ON THE CREEP SUBSTRUCTURE OF Fe-3.0% Si.
Technical rept.,
by Craig R. Barrett, William D. Nix, and Oleg D. Sherby. 1 Jun 65, 28p Rept. no. SUDMS-65-25, TR-9
Contract Nonr22560, Proj. NR031 682
Unclassified report

Descriptors: (*Iron alloys, Crystal substructure), (*Creep, Iron alloys), Crystal lattice defects, Grain structures(Metallurgy), Strain(Mechanics), Density, Silicon alloys.

The dislocation substructure generated during creep of an Fe-3.0% Si alloy has been investigated using both etch pit and transmission electron microscopy techniques. Three different grain sizes were investigated, namely 0.05, 0.1 and 0.3 mm. The type of subgrain structure

generated during creep is somewhat dependent on the grain size. The 0.05 mm grain size samples exhibit an equiaxed subgrain structure, whereas the 0.1 and 0.3 mm grain size samples exhibit both equiaxed and banded subgrain structures. The banded dislocation substructure is believed due to slip band formation. Measurements of the dislocation density, rho, not associated with subboundaries, reveal the following general trends. During primary creep, rho is a function of strain, decreasing with increasing strain. During steady state creep, rho is independent of both strain and grain size. Assuming that the density of dislocations not associated with subboundaries is an accurate measure of the mobile dislocation density, the average dislocation velocity, v, is also a function of strain during primary creep, generally decreasing as the strain increases. (Author)

AD-618 208 Div. 17/2, 17/5, 17/4, 17/6
CFSTI Prices: HC$1.00 MF$0.50

Defense Metals Information Center, Columbus, Ohio.
MECHANICAL PROPERTIES OF METALS; REVIEW OF RECENT DEVELOPMENTS,
by J. E. Campbell. 20 Jul 65, 6p

Unclassified report

Descriptors: (*Metals, Mechanical properties), (*Reviews, Metals), Low-temperature research, Fracture(Mechanics), Fatigue(Mechanics), Corrosion, Stainless steel, Maraging steels, Aluminum alloys, Titanium alloys, Nickel alloys, Chromium alloys, Toughness, Environmental tests, Stresses.

AD-618 228 Div. 14/8, 4/3
CFSTI Prices: HC$3.00 MF$0.75

Institute of Rubber Research, Univ. of Akron, Ohio.
LOW TEMPERATURE POLYMERIZATION STUDIES.
Progress rept. no. 6, 1 Apr-30 Jun 65,
by Maurice Mortion. 15 Jul 65, 65p
Contract AF04 611 9694, Proj. 3148

Unclassified report

See also AD-613 529.

Descriptors: (*Polymerization, Radiation chemistry), (*Radiation chemistry, Polymerization), (*Thermochemistry, Polymerization), Low-temperature research, Acrylonitrile polymers, Vinyl plastics, Halocarbon plastics, Aldehydes, Ketones, Nitriles, Gamma rays.

The report contains results on the polymerization or attempted polymerization of the following monomers by gamma radiation (7.6 x 100,000 rads per hour) at reduced temperatures: Fluoral, Acrylonitrile, Vinyl fluoride, Vinylidene fluoride, Trifluoroethylene, Tetracyanoethylene, Perfluorobutene-2, Hexafluoropropylene, Vinyl triethoxysilane, Para-nitrostyrene, Benzaldehyde.

AD-618 290 Div. 14/7
CFSTI Prices: HC$3.00 MF$0.75

New York Univ., N. Y. School of Engineering and Science.
DEVELOPMENT OF COATINGS ADHERENT TO METALS UNDER VIBRATION CONDITIONS.
Intermediate progress rept. (In lieu of Letter rept. no. 12) 27 Apr 64-27 Apr 65,
by Max Kronstein. 29 May 65, 84p
Contract NObs90357, Proj. 1130

Unclassified report

Descriptors: (*Coatings, Metals), (*Plastic paints, Metals), (*Metals, Coatings), Vibration, Environmental tests, Surface properties, Aging (Materials), Additives, Ultrasonic radiation, Antifouling coatings, Metalorganic compounds, Epoxy plastics, Vinyl plastics, Selenous acids, Tin compounds, Rubber coatings, Synthetic rubber, Polymers.

The coating adherence to metals under vibration conditions is being studied as a system anchored to the metal in the interface area on the metal surface and on the interreaction between the primer coatings and the interface area. The stability of the subsequent coating applications is studied as influenced by the degree of curing or solvent release in the various coating layers. The influence of crosslinking agents on the result of the curing of polymer.components is studied using primarily a vinyl cyclohexene dioxide and a reactive derivative of this same di-epoxide with tetra isopropyl titanate as an effective crosslinking agent. Electron microscope studies are applied in this investigation. The vibration studies are made in this report using a source of ultrasonic vibration in a 5% saltwater tank as a test medium. (Author)

AD-618 291 Div. 17/7
CFSTI Prices: HC$2.00 MF$0.50

Universidad Nacional de Cuyo, San Carlos de Bariloche (Argentina). Instituto de Fisica.
CREEP AT HIGH TEMPERATURES IN Ni-Fe ALLOYS ON SOME MODELS OF WORK HARDENING OF SUPERSTRUCTURES,
Annual rept. for 1 Mar 64-28 Feb 65,
by Aldo E. Vidoz and C. A. Pampillo. 28 Feb 65, 27p
Grant DA ARO49 092 64G36

Unclassified report

Descriptors: (*Nickel alloys, Iron alloys), (*Creep, Nickel alloys), Iron alloys, High-temperature research, Stresses, Heat of activation, Hardening, Crystal lattice defects.

The creep behavior of Ni3Fe and Ni-20 at % Fe alloys has been investigated in the temperature range between, approximately, 530 to 720C. The experimental activation enthalpy for creep was found to be, within the experimental error, in agreement with the available data for diffusion of Fe in Ni-Fe alloys for the case of the Ni-20 at % Fe alloy. For the stoichiometric composition it is suggested that the diffusion of Ni is the controlling factor. It is proposed that dislocation climbing is the rate controlling process for creep in the Ni-20 at % Fe alloy and gliding of dislocations through a short range ordered structure is controlling the creep rate in the Ni-25 at % Fe alloy. Several other experimental results are discussed. (Author)

AD-618 303 Div. 14/2, 4/2, 25/2
CFSTI Prices: HC$2.00 MF$0.50

Raytheon Co., Waltham, Mass. Research Div.
GROWTH AND PROPERTIES OF II-VI COMPOUNDS.
Final rept. for Oct 62-Jan 65,
by D. Warschauer and M. Lichtensteiger. May 65, 41p
Rept. no. S-722
Contract AF33 657 9809, Proj. 7885, Task 788503
ARL 65-99

Unclassified report

Descriptors: (*Single crystals, Crystal growth), (*Powders, Preparation), (*Calcium compounds, Synthesis(Chemistry)), (*Strontium compounds, Synthesis(Chemistry)), (*Barium compounds, Synthesis(Chemistry)), Sulfides, Selenides, Telurides, Purification, Distillation, Zone melting, Reduction(Chemistry), Inorganic acids, Transport properties, Impurities.

The preparation of powders of II-VI compounds of high purity was investigated. The group II metal starting

material was purified by repeated distillation under argon. Purities of 99.99% were attained. Various methods of synthesis of the compounds were evaluated with regard to maintaining purity and additional purification. Hydrogen reduction of the chalcogenates was selected, resulting in powders with a total impurity content of less than 40 ppm. Attempts to grow single crystals were only partly successful due to the highly refractory nature of the compounds. Small single crystals of barium sulfide were obtained, however, they are heavily contaminated with tungsten. (Author)

AD-618 316 Div. 17/2, 17/6, 14/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson, AFB, Ohio.
ON STABILITY OF CERTAIN MATERIALS IN LIQUID ALUMINUM,
by Kh. V. Keerus, M. M. Saar, and Kh. A. Tiismus.
3 Jun 65, 15p Rept. no. FTD-MT-64-513
TT 65-62659

Unclassified report

Edited machine trans. of Politekhnicheskii Institut, Tallinn. Trudy (Estonian SSR) serA n197 p155-65 1962.

Descriptors: (*Aluminum, Liquid metals), (*Liquid metals, Compatibility), (*Liquid metal pumps, Corrosion inhibition), (*Corrosion, Liquid metals), Stability, Corrosive liquids, Protective treatments, Pipes, Metals, Ceramic materials, Quartz, Graphite, Corundum, Magnesium compounds, Carbonates, Coatings, Ceramic coatings, Aluminum compounds, Oxides.

An investigation was made to determine the compatibility of materials with liquid aluminum for use in liquid metal pumps.

AD-618 357 Div. 17/2, 30/5

Pennsylvania State Univ., University Park. Dept. of Engineering Mechanics.
EXPERIMENTAL TECHNIQUES FOR THE DIRECT OBSERVATION OF FATIQUE-INDUCED DEFORMATION FAULTING IN THIN-FOIL STAINLESS STEEL,
by L. E. Murr and P. J. Smith. 19 Aug 64, 7p
Grant AF AFOSR165 63
AFOSR 65-1155

Unclassified report

Pub. in Transactions of the Metallurgical Society of AIME v233 p755-61 Apr 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Stainless steel, Crystal lattice defects), (*Electron microscopy, Stainless steel), Foils, Deformation, Fatigue(Mechanics), Microstructure.

A study was made by transmission electron microscopy of thin foils of 304 stainless steel fatigued external to the electron microscope in reversed bending, and of thin foils fatigued directly within the microscope in alternating tension. The build-up of stacking faults in the thin foils during fatigue was correlated with the dislocation structures found in thin films prepared from fatigued bulk specimens. The performance of the special devices designed for fatigue of thin foils so outlined and the importance of alternative methods of preparation of more uniform fatigue specimens by vapor deposition are emphasized. (Author)

AD-618 375 Div. 17/2, 17/5, 13/4
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
CORROSION OF MILD STEEL IN CONCRETE.
Final rept., suppl.,
by Donald F. Griffin. Aug 65, 33p
Rept. no. TR-R306, suppl.
Proj. Y R007 05 01 012

Unclassified report

Supplement to AD-603 376.

Descriptors: (*Corrosion, Steel), (*Steel, Corrosion), (*Reinforced concrete, Steel), Sea water, Salt spray tests, Sodium compounds, Chlorides, Corrosion inhibition, Reinforcing materials, Penetration, Fracture-(Mechanics, Aging(Materials), Degradation, Life expectancy.

In a research effort to determine the fundamental cause of deterioration of certain concrete buildings in a marine environment. It was shown that sea salts can accumulate in a building wall exposed to airborne sea spray in quantities sufficient not only to deteriorate the concrete but also to cause the reinforcing steel to rust and thereby expand with enough force to crack the concrete. In small reinforced concrete walls sprayed with sea water once each morning, the same destructive phenomena has occurred at the Laboratory within a period of 2 years that occurred in about the same length of time to concrete buildings on the Pacific Ocean atolls. The concrete has cracked severely along the lines of the reinforcing steel. In order to reduce the adverse effects of salt and increase the life of a reinforced concrete building in a marine environment, no salt water should be added to the concrete at the time of mixing the concrete. Corrosion of the reinforcing steel will be delayed if the initially salt-free concrete is of high quality, with low permeability and a low water-cement ratio. The greater the depth of embedment of the reinforcing steel (taking practical considerations and economy into account), the greater will be the delay of salt penetration to it; and the increased depth of cover will provide greater resistance to rupture by the pressure induced by the building of corrosion products on the steel. (Author)

AD-618 413 Div. 17/6
CFSTI Prices: HC$4.00 MF$1.00

Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy.
EFFECTS OF SOLIDIFICATION VARIABLES ON THE STRUCTURE OF ALUMINUM BASE ALLOYS.
Annual rept. for Jun 63-Jun 64,
by T. F. Bower, H. D. Brody, and M. C. Flemings.
Jun 65, 128p
Contract DA19 0200RD5706A

Unclassified report

See also AD-607 716.

Descriptors: (*Aluminum alloys, Phase studies), (*Phase studies, Aluminum alloys), (*Costing, Aluminum alloys), Eutectics, Costings, Copper alloys, Grain structures-(Metallurgy), Porosity, Microstructure, Diffusion.

An analytic and experimental study was made of the factors influencing dendritic structure, microsegregation and porosity in aluminum-base alloys produced under various growth conditions. Apparatus designed for controlled ingot solidification was used to study (a) interrupted solidification, (b) programmed solidification, (c) unidirectional solidification, (d) solidification under vibration, (e) liquid metal feeding of solidification shrinkage, and (f) slow solidification with high local temperature gradient ('Grain Refinement Probe').

AD-618 480 Div. 14/6, 31/4
CFSTI Prices: HC$4.00 MF$0.75

Naval Ordnance Lab., White Oak, Md.
FEASIBILITY STUDY OF PLASTIC-CLAD GLASS CAPSULES FOR DEEP-DIVING SUBMERSIBLES.
Final rept.,
by W. B. Coffman, R. S. Allgaier, E. L. Criscuolo, V. C. Dawson, and L. C. Fisher. 3 Jun 65, 102p
Rept. no. NOLTR-65-76
Task NOL732SP PR29

Unclassified report

Descriptors: (*Submarine hulls, Composite materials), (*Composite materials, Submarine hulls), Feasibility studies, Glass, Cladding, Plastics, Reinforcing materials, Rings, Buckling, Structural properties, Penetration, Material forming, Physical properties, Spheres, Isocyanate plastics, Structural shells, Stresses, Mathematical analysis.

A study was made to determine what, if any, further applied research and exploratory development are required prior to development of a full-scale, manned plastic-clad glass capsule as part of a deep submersible. The theoretical advantages are numerous and the available experimental information is encouraging; however, more tests on larger-scale models and more fundamental engineering information on glass properties is required to permit design with confidence. (Author)

AD-618 522 Div. 14/5, 1/9
CFSTI Prices: HC$1.00 MF$0.50

Shell Oil Co., Wood River, Ill. Research Lab.
STUDY OF HELICOPTER GEAR LUBRICATION.
Quarterly progress rept. no. 1, Mar-May 65,
by D. R. Bailey, S. J. Beaubien, and J. Bevel.
May 65, 16p
Contract NOw65 0323c

Unclassified report

Descriptors: (*Helicopters, Gears), (*Lubrication, Gears), (*Gears, Lubrication), Coatings, Failure(Mechanics), Fatigue(Mechanics), Tests, Loading(Mechanics), Lubricant additives, Performance(Engineering), Esters, Lubricants.

Two main subjects are treated: the first is the effect of several gear surface precoatings on gear performance; the second is the gear performance of a typical synthetic, tetraester, five-centistoke base oil. It was found that precoating gears by heating in atmospheres of air, or a diester base oil, had little effect on the score load of a MIL-L-23699 test oil, while gears treated in a nitrogen atmosphere gave an increase in score load. Fatigue life as measured by the time to pitting failure, on the other hand, was considerably affected by the precoatings, particularly at high speed. In constant load tests at 6400 rpm it was found that the diester oil precoating extended gear life by a factor greater than seven, while the air precoating increased life three times. Under these same conditions the nitrogen treatment had no effect on gear life. While the coating techniques investigated represent only an initial attempt in this field, the improvement in performance is sufficient to warrant further study. From tests with the synthetic base oil, it was found that this oil is rather insensitive to break-in, and that fatigue failures occurred by fatigue-scoring rather than by pitting. The purpose of these tests was to develop groundwork for future exploratory studies involving the effects of EP additives on gear performance. (Author)

AD-618 634 Div. 14/6, 4/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF HEAT DISINTEGRATION ON THE THERMOPHYSICAL PROPERTIES OF MONOISOPROPYLDIPHENYL,
by D. S. Rasskazov, Yu. M. Babikov, and K. Khamann.
14 Jul 65, 13p Rept. no. FTD-TT-65-344
TT 65-62698

Unclassified report

Unedited rough draft trans. of Teploenergetika (USSR) v11 n9 p71-3 1964.

Descriptors: (*Coolants, Pyrolysis), (*Aromatic compounds, Pyrolysis), Thermal properties, Stability, Viscosity, Density, Additives, Polymers, USSR.

Results are given of investigation on the thermal stability of monoisopropyldiphenyl in the liquid phase. Work was conducted on the effect of a high-boiling radical on the viscosity and density of a partial disintegrating liquid. (Author)

AD-618 641 Div. 14/4, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
STUDYING THE CONDITIONS OF MANUFACTURING GLASS FIBERS WITHOUT SURFACE DEFECTS,
by L. K. Izmailova and G. M. Bartenev. 19 May 65,
13p Rept. no. FTD-TT-64-1172
TT 65-62705

Unclassified report

Unedited rough draft trans. of Steklo i Keramika (USSR). v21 n3 p12-6 1964.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Glass textiles, Manufacturing methods), (*Manufacturing methods, Glass textiles), (*Surface properties, Glass textiles), Coatings, Protective treatments, Strength, Fracture(Mechanics), Humidity, Mechanical properties, Processing, USSR.

AD-618 645 Div. 14/8, 4/4, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ELECTRIC AND MAGNETIC PROPERTIES OF POLYARYLENQUINONES,
by A. A. Dulov and B. I. Liogonkii. 8 Jun 65, 8p
Rept. no. FTD-TT-65-158
TT 65-62709

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Khimicheskaya. n5 p909-12 1964.

Descriptors: (*Semiconductors, Polymers), (*Polymers, Semiconductors), (*Quinones, Polymers), Molecular structure, Density, Electrical properties, Resistance-(Electrical), Magnetic properties, Paramagnetic resonance, Reduction(Chemistry), X-ray diffraction analysis, USSR.

A relationship was revealed between the molecular structure, packing density and electrical properties of polyarylenguinones. It was established that there is a sharp reduction in resistance when polyarylenquinones are reduced into stable semiquinone form. (Author)

AD-618 648 Div. 14/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.

SITALLS, THE NEW INORGANIC MATERIAL IN MODERN TECHNOLOGY,
by N. A. Toropov. 19 May 65, 10p Rept. no. FTD-TT-65-58 TT 65-62712

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Vestnik. n10 p43-6 1963.

Descriptors: (*Ceramic materials, Physical properties), Crystallization, Heat-resistant materials, Hardness, Dielectric properties, Glass, USSR.

The article concerns sitalls (devitric ceramics or pyroceramics) which are a class of glass-crystal materials. Sitalls possess high resistance to fire and heat, stand up well under sharp changes in temperature, and are distinguished by their hardness and high mechanical strength, as compared with glass. They are characterized by splendid electrical insulation properties. The low density in connection with the high mechanical indices makes it possible to use them in a number of cases as very effective building material.

AD-618 681 Div. 17/4, 17/6, 17/7
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.

EFFECTS OF ALLOYING UPON CERTAIN PROPERTIES OF 55.1 NITINOL,
by D. M. Goldstein, W. J. Buehler, and R. C. Wiley.
28 May 65, 42p Rept. no. NOLTR-64-235
Proj. RRMA02009R007 06 01

Unclassified report

Descriptors: (*Intermetallic compounds, Nickel alloys), (*Nickel alloys, Titanium alloys), Tungsten, Filaments, Compatibility, Hardness, Copper alloys, Tantalum alloys, Molybdenum alloys, Chromium alloys, Aluminum alloys, Silicon alloys, Niobium alloys, Iron alloys, Vanadium alloys, Manganese alloys, Cobalt alloys, Mechanical working, Alloys, Brazing, Microstructure.

Ternary alloys of the intermetallic compound TiNi were hot hardness tested. Although hardness can be increased by such alloying, neither the base material nor the alloys offer promise for long time service use above 800F. Silicon, aluminum, iron, and cobalt are effective room temperature hardeners. A unique interfacial compatibility between TiNi and tungsten bulk metal was discovered. It is believed that this will enable introduction of a new metal-metal composite system of fibrous tungsten in a Nitinol matrix. A rod of such material is shown to be capable of room temperature swaging, suggesting improved methods of working highly refractory metals. Silver-free TiNi brazing alloys for joining tungsten metals are a natural result of such compatibility. (Author)

12. Mathematical Sciences

AD-617 911 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
MATHEMATICAL STUDIES: PSEUDO-DIFFERENTIAL OPERATORS; NON-COERCIVE BOUNDARY VALUE PROBLEMS; FREDHOLM OPERATORS AND THE ESSENTIAL SPECTRUM; THE LIMITING AMPLITUDE PRINCIPAL; AND TRANSONIC FLOW.
Final rept. for 1 Apr 64-31 May 65,
by L. Nirenberg. 7 Jul 65, 3p
Contract DA31 124AROD204
AROD 247:66

Unclassified report

Descriptors: (*Mathematics, Scientific research), Operators(Mathematics), Boundary value problems, Functional analysis, Partial differential equations, Quantum mechanics, Transonic flow.

AD-617 929 Div. 15/2
CFSTI Prices: HC$4.00 MF$0.75

Goteborg Univ. (Sweden).
SELECTED BIBLIOGRAPHY ON NON-NORMALITY,
ed. by H. Hyrenius and I. Adolfsson. 1964, 110p
Rept. no. 3
Contract AF61 052 459, Proj. 9749, Task 974902
AFOSR 65-1030

Unclassified report

Goteborg Univ. Dept. of Statistics Pub. no. 12.

Descriptors: (*Bibliographies, Statistical processes), (*Statistical processes, Bibliographies), Abstracting, Population(Mathematics), Sampling, Monte Carlo method, Sweden.

The bibliography presented is a part of a larger research project, which is designed to study the effects on normal-theory statistical methods arising when the underlying assumption of a normal universe is not fulfilled. Only abstracts from the most important scientific journals plus those further references which were found in articles in these journals are included. (Author)

AD-617 937 Div. 15/2
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Dept. of Statistics.
THE ROLE OF SPECTRAL ANALYSIS IN TIME SERIES ANALYSIS.
Technical rept.,
by Emanuel Parzen. 12 Jul 65, 29p
Rept. no. TR-2
Contract Nonr22580, Proj. NR042 234

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.'

Descriptors: (*Statistical analysis, Series), (*Stochastic processes, Statistical analysis), Time, Mathematical models, Mathematical prediction.

The basic formulas employed in the empirical spectral analysis of a single time series are summarized. Their applicability to the problem of analyzing and synthesizing 'adaptive predictors' for time series is shown. (Author)

AD-617 939 Div. 15/2
CFSTI Prices: HC$1.00 MF$0.50

Applied Mathematics and Statistics Labs., Stanford Univ., Calif.
IRRATIONAL FRACTION APPROXIMATIONS TO MILL'S RATIO.
Technical rept.,
by Harold Ruben. 31 Jul 63, 15p Rept. no. TR-89
Contract Nonr22552, Proj. NR342 022

Unclassified report

See also AD-277 106.

Descriptors: (*Continued fractions, Power series), (*Integrals, Probability), Integrations, Binomials, Functions.

AD-618 034 Div. 15/1

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
TABLES RELATING TO THE RADIAL MATHIEU FUNCTIONS. VOLUME 2. FUNCTIONS OF THE SECOND KIND,
by G. Blanch and D. S. Clemm. 1965, 490p

Unclassified report

Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $4.00 as D-301.45:M42/V2.

Descriptors: (*Special functions(Mathematical), Tables), (*Tables, Special functions(Mathematical)), Numerical analysis, Functional analysis.

AD-618 050 Div. 15/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
INTERVAL ARITHMETIC WITH SOME APPLICATIONS FOR DIGITAL COMPUTERS,
by Sidney Shayer. Jul 65, 92p
Rept. no. 5-13-65-12

Unclassified report

Descriptors: (*Programming(Computers), Algebra), (*Algebra, Real numbers), Taylor's series, Boundary value problems, Differential equations, Groups-(Mathematics), Digital computers, Errors, Numerical analysis.

The purpose of this paper is to present a proposed solution to the problem of finding rigorous error bounds, by the use of interval arithmetic. Interval arithmetic is a method of computation in which the rational operations on real numbers are replaced by corresponding operations on closed intervals. That such a replacement is always possible is shown. A discussion is given of interval arithmetic as a system - definitions, operations, theorems, and elementary consequences. An algorithm is presented for the computation of certain functions by the Taylor series, and which has error bounds built into the algorithm. Finally, closed intervals are employed to solve the initial-value first-order differential equation dy dx = f(x,y).

AD-618 086 Div. 15/2, 15/1
CFSTI Prices: HC$1.00 MF$0.50

New York State Univ., Buffalo.
STOCHASTIC VERSUS DETERMINISTIC CONDITIONS IN A COMPETITIVE GAME WITH TWO LENGTHS OF BOARD.
Technical rept.,
by W. Edgar Vinacke, Cary M. Lichtman, and Paul D.

Cherulnik. 10 Jun 65, 24p Rept. no. TR-9
Contract Nonr437400

Unclassified report

Descriptors: (*Game theory, Stochastic processes), (*Stochastic processes, Game theory), Determination, Attitudes, Experimental data.

An experiment was conducted to determine changes in strategy and ensuing coalitions brought about by stochastic conditions of play, in comparison with deterministic procedure. The latter, as previously employed, fixes the moves of all players at each stage of play. The former permits each player's move to be contingent upon his own action. In a competitive board game, employing triads as subjects, deterministic procedure was established by having players take turns in throwing the dice as agent for all three members of the group. Stochastic procedure was established by allowing each player in turn to throw the dice to determine his own distance of move. In addition, a long and a short board were used to provide an additional test of the tendency to 'gamble.' It was hypothesized that gambling would be manifested under stochastic and short-board conditions. This should especially be revealed in fewer coalitions. Ten triads of each sex were run under each of the four conditions (two procedures x two boards). They played three successive games each of the power-types All-Equal (111), All-Different (432), and All-Powerful (421). Pre- and post-session questionnaires were administered. All Ss took the Test of Strategy prior to the game. Analysis of various aspects of strategy disclosed a number of significant differences between conditions, especially between Deterministic Long Board and Stochastic Short Board, as expected. Chiefly, there were fewer coalitions under the stochastic and short board conditions. The overall pattern of differences indicated that players tended to 'gamble' in these conditions, in an effort to win by their own resources.

AD-618 112 Div. 15/2, 16/10
CFSTI Prices: HC$2.00 MF$0.50

Operations Research Center, Univ. of California, Berkeley.
BOUNDS FOR LATTICE DISTRIBUTIONS HAVING MONOTONE HAZARD RATE WITH APPLICATIONS,
by Gamanlal P. Shah. Jun 65, 37p
Rept. no. ORC-65-12
Contract Nonr365618

Unclassified report

Descriptors: (*Distribution theory, Stochastic processes), (*Stochastic processes, Reliability), Hazards, Cancer, Medical research, Statistical analysis, Life span, Operations research.

Using methods which have been employed for obtaining bounds on continuous failure distributions, bounds on lattice distributions are derived under the increasing (decreasing) failure rate assumptions. The discrete bounds are convenient in a number of applications such as life table analysis and reliability theory.

AD-618 134 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Washington Univ., Seattle.
A RIGIDITY THEOREM FOR SUBALGEBRAS OF LIE AND ASSOCIATIVE ALGEBRAS.
Technical rept.,
by Roger W. Richardson. Jul 65, 25p
Rept. no. TR-25
Contract Nonr47715, Proj. NR043 186

Unclassified report

Descriptors: (*Theorems, Algebras), (*Algebras, Theorems), Algebraic topology, Algebraic geometry, Differential geometry.

AD-618 184 Div. 15/2

Harvard Univ., Cambridge, Mass.
ON THE NORMAL SCORES TWO-SAMPLE RANK TEST.
Rept. for 1 Jun 63-31 May 64,
by J. H. Klotz. 1962, 15p
Contract Nonr186637, Proj. NR042 097

Unclassified report

Pub. in Journal of the American Statistical Association v59 p652-64 Sep 1964 (Copies not available to DDC or Clearinghouse customers)
Prepared in cooperation with Harvard Univ., Cambridge, Mass. Computing Center and Massachusetts Inst. of Tech., Cambridge. Computation Center, Grant NSF GP683.

Descriptors: (*Sampling, Statistical tests), (*Statistical tests, Sampling), Programming(Computers), Distribution theory.

A simplification using symmetry is applied to the null distribution of the Fisher-Yates test or c sub 1 test of Hoeffding and Terry. A computer is used to extend existing tables to combined sample size N < or = 20. The t approximation of Hoeffding and Terry and the normal approximation are investigated with the former found to be satisfactory at the limit of the tables when the ratio of sample sizes is not too extreme. Selected power calculations for N < or = 10 are given for normal shift alternatives. (Author)

AD-618 185 Div. 15/2

Harvard Univ., Cambridge, Mass.
SMALL SAMPLE OF THE BIVARIATE SIGN TESTS OF BLUMEN AND HODGES.
Rept. for 1 Jun 64-31 May 65,
by Jerome Klotz. 30 Jun 64, 8p
Contract Nonr186637, Proj. NR042 097

Unclassified report

Pub. in Annals of Mathematical Statistics v35 n4 p1576-82 Dec 1964 (Copies not available to DDC or Clearinghouse customers)
Prepared in cooperation with Harvard Univ., Cambridge, Mass. Computing Center, Grant NSF GP683.

Descriptors: (*Statistical tests, Sampling), (*Sampling, Statistical tests), Probability, Programming(Computers).

Exact power for normal location alternatives is obtained for the bivariate sign tests of Blumen and Hodges. A recursive scheme, used in conjunction with a computer, permits comparison of the two tests for sample sizes n = 8(1)12. Efficiency values relative to Hoteling's bivariate T square test are also obtained for the test of Hodges. Slight power differences are noted for the sign tests along with surprisingly high power when compared with the T square. (Author)

AD-618 186 Div. 15/2

Harvard Univ., Cambridge, Mass.
ROBUSTNESS OF SOME PROCEDURES FOR THE TWO-SAMPLE LOCATION PROBLEM,
by John W. Pratt. 1963, 17p
Contract Nonr186637, Proj. NR042 097

Unclassified report

Pub. in Journal of the American Statistical Association v59 p665-80 Sep 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Statistical tests, Sampling), (*Sampling, Statistical tests), Population(Mathematics), Programming(Computers).

The level of ordinary two-sample procedures is not preserved if the two populations differ in dispersion or shape. The effect of such differences, especially differences in dispersion, on the t, median, Mann-Whitney, and normal scores procedures is investigated asymptotically, and tables are given comparing the four procedures. (Author)

AD-618 189 Div. 15/2

Minnesota Univ., Minneapolis.
THEORY OF LOWER ROUNDS FOR RISK FUNCTIONS IN ESTIMATION,
by M. M. Rao. 3 Dec 60, 20p
Contract Nonr258200; Grant NSF G14832, Proj. NR042 200
Unclassified report

Pub. in Mathematische Annalen v143 p379-98 1961 (Copies available only to DDC users).

Descriptors: (*Functional analysis, Theory), Probability, Measure theory, Statistical functions.

AD-618 201 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
PROGRAMMING UNDER UNCERTAINTY AND STOCHASTIC OPTIMAL CONTROL,
Mathematical note,
by Richard Van Slyke and Roger Wets. Apr 65, 32p
Rept. nos. D1-82-0429, MN-405
Unclassified report

Prepared in cooperation with Operations Research Center, Univ. of California, Berkley; Contract Nonr22283. Also available from the author.

Descriptors: (*Mathematical programming, Probability), (*Optimization, Control), Stochastic processes, Decision theory, Convex sets, Linear programming, Mathematical models.

The theory of programming under uncertainty is extended to the case when the decision variables are elements of a Banach space. This approach leads to a very natural application of the computational techniques of mathematical programming to stochastic optimal control problems. It is shown that there exists an equivalent deterministic mathematical program whose set of feasible solutions is a convex set and whose objective function can be expressed as a convex function of the initial decision variables. In the second part, a duality theory is developed for this class of problems and some of the relations to the maximum principle for stochastic linear control problems are given. (Author)

AD-618 214 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.50

Computer Science Div., Stanford Univ., Calif.
CONVEX POLYNOMIAL APPROXIMATION,
Technical rept.,
by Bernard D. Rudin. 4 Jun 65, 51p Rept. no. CS-23
Contract Nonr22537, Proj. NR044 211
Unclassified report

Descriptors: (*Functional analysis, Polynomials), (*Polynomials, Functional analysis), (*Convex sets, Functional analysis), Least squares method, Numerical analysis.

The problem considered is that of obtaining polynomial approximations to continuous functions or empirical data in such a way that the approximating polynomials are convex in some prescribed interval. This problem arises naturally in connection with data smoothing and was in fact suggested to the author by a problem requiring the calculation of derivatives from data.

AD-618 216 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

Computer Science Div., Stanford Univ., Calif.
AN ANALYSIS OF ONE ALGORITHM OF HEIGHTENED PRECISION OF THE METHOD OF NETS FOR THE SOLUTION OF POISSON'S EQUATION,
Technical rept.,
by E. A. Volkov. 4 Jul 65, 33p Rept. no. CS-27
Contract Nonr22537, Proj. NR044 211
TT 65-62654
Unclassified report

Trans. of Vychislitel'naya Matematika (USSR) v1 p62-80 1957.

Descriptors: (*Difference equations, Numerical methods and procedures), (*Numerical methods and procedures, Difference equations), Partial differential equations, Errors, USSR.

In this work, we investigate a technique of successive improvement for the finite-difference solution of Poisson's equation, proposed empirically in a work by L. Fox. The basic results were explained in a previous note. (Author)

AD-618 217 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. School of Humanities and Sciences.
MATRIX THEORIES FOR PARTIAL DIFFERENTIAL AND DIFFERENCE EQUATIONS,
Technical rept.,
by John Miller and Gilbert Strang. 16 Jul 65, 35p
Rept. no. CS-28
Contract Nonr22537, Proj. NR044 211
Unclassified report

Descriptors: (*Matrix algebra, Partial differential equations), (*Difference equations, Matrix algebra), Integral transforms.

AD-618 240 Div. 15/1

California Univ., Los Angeles. Dept. of Mathematics.
REMARKS ON A PAPER OF TAUSSKY,
by Raymond Redheffer. 1965, 6p
Unclassified report

Pub. in Journal of Algebra v2 n1 p42-7 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Matrix algebra, Theorems), Algebras, Functional analysis, Number theory.

AD-618 264 Div. 15/2

Cornell Univ., Ithaca, N. Y.
ADMISSIBLE BAYES CHARACTER OF T(2), R(2)-, AND OTHER FULLY INVARIANT TESTS FOR CLASSICAL MULTIVARIATE NORMAL PROBLEMS,
by J. Kiefer and R. Schwartz. 27 Aug 64, 24p
Contract Nonr26604, Proj. NR047 005
Unclassified report

Pub. in Annals of Mathematical Statistics v36 n3 p747-70 Jun 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Statistical tests, Theory), Matrix algebra, Measure theory.

In a variety of standard multivariate normal testing problems, it is shown that certain procedures, often fully invarant, similar, and/or likelihood ratio, are admissible Bayes procedures. The problems include the multivariate general linear hypothesis (where some of the procedures considered were previously shown to be admissible by other methods), the testing of independence of sets of variates (where the likelihood ratio test is shown, for the first time, to be admissble), tests about only some components of the means, classification procedures (for any number of populations), Behrens-Fisher problem, tests about values of or proportionality or equality of covariance matrices, etc. A general technique is developed for obtaining certain Bayes procedures for such problems from the corresponding Bayes procedures relative to a priori distributions of a certain type for problems where nuisance parameter means have been deleted. (Author)

AD-618 279 Div. 15/1

California Univ., Los Angeles. Graduate School of Business Administration.
STOPPING-RULE PROBLEMS. CHAPTER 10,
by Leo Breiman. 1963, 38p Reprint no. WMSI-24
Contract Nonr23375

Unclassified report

Pub. in Applied Combinatorial Mathematics p284-319 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Decision theory, Sequential analysis), (*Dynamic programming, Probability), Game theory, Linear programming, Combinatorial analysis.

AD-618 347 Div. 15/1

Electronics Research Lab., Univ. of California, Berkeley.
AN OPTIMAL REGULATOR PROBLEM,
by Albert Chang. 24 Jul 64, 16p
Grants AF AFOSR292 63, AF AFOSR139 63
AFOSR 65-0908

Unclassified report

Pub. in J. SIAM Control serA v2 n2 p220-33 1965
(Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Control systems, Optimization), (*Optimization, Control systems), Differential equations, Matrix algebra, Hamiltonan, Feedback.

AD-618 351 Div. 15/1

Texas Univ., Austin.
MINIMIZING FUNCTIONALS ON HILBERT SPACE,
by A. A. Goldstein. 1964, 10p
Grants AF AFOSR467 63, AF AFOSR348 62, Proj. 9749, Task 974901
AFOSR 65-1020

Unclassified report

Pub. in Computing Methods in Optimization Problems, p159-65 1964
Proceedings of a conference held at University of California, Los Angeles, Jan 30-31 1964
(Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Functional analysis, Theory), Control, Calculus of variations, Optimization.

This note involves 2 ideas. The first is a generalization of constructive techniques employed for the minimization of quadratic functionals on a real Hilbert space. The extension is for twice differentiable functionals. The second consists of using differentiable functionals to make uniform approximations of nondifferentiable functionals in related examples. Of the 2 examples given, one arises from control theory, the other from approximation theory in the L sub 1 metric. In both problems the functional is minimized on a closed linear variety. (Author)

AD-618 353 Div. 15/1

Institute for Fluid Dynamics and Applied Mathematics, Univ. of Maryland, College Park.
ON A CLASS OF ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS IN FOUR VARIABLES,
by R. P. Gilbert. 22 Nov 63, 17p
Grant AF AFOSR400 64, Proj. 9749, Task 974901
AFOSR 65-1021

Unclassified report

Pub. in Pacific Journal of Mathematics v14 n4 p1223-36 1964
(Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Partial differential equations, Functions), Complex variables, Real variables, Operators(Mathematics), Integrals, Potential theory, Mapping(Transformations).

The given elliptic partial differential equation has been considered by S. Bergman. This paper investigates the 4 variable analogue of this equation, and shows that many of Bergman's results carry over to this case. In many instances, the methods of several complex variables are needed in order to find the natural generalizations. An integral operator is used to study the solutions of the given equations and to map analytic functions of 3-complex variables onto harmonic, function-elements of 4 variables.

AD-618 392 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOLUTION OF THE MATRIX EQUATION d/dt X(t) = A(t) X(t) + X(t) B(t) + U(t).
Technical note,
by Michael Athans. 29 Jun 65, 8p
Rept. no. TN-1965-26
Contract AF19 628 500
ESD TDR-65-262

Unclassified report

Descriptors: (*Matrix algebra, Differential equations), (*Differential equations, Matrix algebra), Functions, Integration.

AD-618 395 Div. 15/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Hughes Aircraft Co., Fullerton, Calif.
CREATIVE COMPUTATION,
Final rept. for Feb 64-Feb 65,
by F. B. Cannonito, V. H. Dyson, A. Kino, and G. Cash.
Jun 65, 71p Rept. no. FR65-11-44
Contract AF30 602 3339, Proj. 5581, Task 558104
RADC TR-65-123

Unclassified report

Descriptors: (*Artificial intelligence, Recursive

functions), (*Recursive functions, Artificial intelligence), (*Mathematical logic, Artificial intelligence), Metamathematics, Automata, Number theory, Information theory, Combinatorial analysis.

The subject of artificial intelligence is viewed from the point of view of recursive function theory and mathematical logic (mathematical automata theory). An analysis of several central problems in this area resulted in the potential application for information retrieval systems, classification of data processing problems in algebra, and realization of computations not possible with standard digital computers. (Author)

AD-618 406 Div. 15/1, 15/2
CFSTI Prices: HC$7.00 MF$1.75

Massachusetts Inst. of Tech., Cambridge. Operations Research Center.
PERTURBATION THEORY AND MARKOVIAN DECISION PROCESSES.
Technical rept.,
by Paul J. Schweitzer. Jun 65, 318p
Rept. no. TR-15
Contract Nonr184187, Proj. NR042 230
Unclassified report

Rept. on Research in the Control of Complex Systems.

Descriptors: (*Perturbation theory, Statistical processes), (*Statistical processes, Perturbation theory), (*Dynamic programming, Statistical processes), Operations research, Probability, Matrix algebra, Iterative methods.

The Howard-Jewell algorithm for programming over a Markov-renewal process is analyzed in terms of a perturbation theory formalism which describes how the stationary distribution changes when the transition probabilities change. The policy improvement technique is derived from this new viewpoint. The relative values may be interpreted as partial derivatives of the gain rate with respect to policy. The value equations are shown to be solvable, with the relative values unique up to one additive constant, if and only if the underlying Markov chain is irreducible. The policy iteration algorithm is shown not to cycle, this guaranteeing convergence. A discussion of the existence, uniqueness, and characterization of the solution to the functional equation of dynamic programming is given. Emphasis is placed upon the value maximization of transient states. The fundamental matrix is developed as a useful tool for doing perturbation theory, describing first-passage properties of semi-Markov processes, and for dealing with semi-Markov processes with rewards. (Author)

AD-618 433 Div. 15/1

Yale Univ., New Haven, Conn.
ON RADICALS OF DISCRETE SUBGROUPS OF LIE GROUPS,
by Louis Auslander. 15 Feb 62, 10p
Contract DA19 020ORD5254; Grant NSF G15565
Unclassified report

Pub. in American Journal of Mathematics v85 n2 p145-50 Apr 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Groups(Mathematics), Theorems), Algebra.

AD-618 439 Div. 15/1

Miami Univ., Coral Gables, Fla.
BROWN'S METHOD OF EXTENDING FIXED POINT THEOREMS,
by J. D. McKnight, Jr. 1962, 3p
Contract AF49 638 1215
AFOSR 65-1024
Unclassified report

Pub. in American Mathematical Monthly v72 n2 p152-5 Feb 1965.
(Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Theorems, Functional analysis), (*Topology, Theorems), Transformations(Mathematics).

AD-618 481 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.75

Naval Research Lab., Washington, D. C.
TABLES OF SPHERICAL HANKEL FUNCTIONS OF IMAGINARY ARGUMENT.
Final rept.,
by A. R. Knudson. 28 Jun 65, 96p Rept. no. NRL-6288
Proj. RR002 06 41 5001
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Bessel functions, Tables), (*Tables, Special functions(Mathematical)), (*Special functions-(Mathematical), Tables), Complex numbers.

AD-618 502 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
MINIMIZING CONVEX FUNCTIONS OVER A SIMPLEX.
Mathematical note,
by Sam C. Saunders and Gordon B. Crawford. Apr 65, 17p Rept. nos. MN-404, D1-82-0428
Unclassified report

Also available from the author.

Descriptors: (*Functions, Iterative methods), (*Iterative methods, Functions), Linear programming, Operators-(Mathematics).

The authors present an iteration procedure to locate the minimum of a continuously differentiable strictly convex function over the unbounded simplex in Euclidean n-space, and prove that the procedure converges to the unique minimum. This procedure is constructed to facilitate its adaptation to machine programming. Applications of this procedure to maximum likelihood estimation in certain non-parametric cases are mentioned. (Author)

AD-618 515 Div. 15/1, 30/2
CFSTI Prices: HC$5.00 MF$1.00

Rocketdyne, Canoga Park, Calif.
DESIGN, TESTING AND ESTIMATION IN COMPLEX EXPERIMENTATION. I. EXPANSIBLE AND CONTRACTIBLE FACTORIAL DESIGNS AND THE APPLICATION OF LINEAR PROGRAMMING TO COMBINATORIAL PROBLEMS.
Final rept. for period ending Feb 65,
by Steve R. Webb. Jun 65, 164p
Rept. no. R-6078-1
Contract AF33 616 7372, Proj. 7071, Task 707101
ARL 65-116 P1
Unclassified report

Descriptors: (*Linear programming, Combinatorial analysis), (*Combinatorial analysis, Linear programming),

Programming(Computers), Optimization, Sequential analysis.

This report describes results of research on factorial designs during a two-year period ending in February 1965. These include (a) characterizations of orthogonal and two classes of non-orthogonal designs as solutions to linear constraints, (b) optimality properties of orthogonal designs, (c) development of a general class of non-orthogonal sequential factorial designs, (d) results on certain families of 2(n) designs, and (e) description of a special-purpose linear programming computer routine for combinatorial problems in experimental design. (Author)

AD-618 516 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.75

Rocketdyne, Canoga Park, Calif.
DESIGN, TESTING AND ESTIMATION IN COMPLEX EXPERIMENTATION. II. RELIABILITY GROWTH PROCESSES: ESTIMATION THEORY AND DECISION-THEORETIC FORMULATIONS.
Final rept. for period ending Feb 65,
by Bernard Sherman and Mitchell O. Locks.
Jun 65, 76p Rept. no. R-6078-2
Contract AF33 616 7372, Proj. 7071, Task 707101
ARL 65-116 P2

Unclassified report

Descriptors: (*Combinatorial analysis, Reliability), (*Reliability, Decision theory), (*Decision theory, Combinatorial analysis), Dynamic programming, Failure(Mechanics), Operations research.

Properties of maximum-likelihood estimators of parameters of reliability growth processes are investigated. It is shown that the maximum-likelihood estimator for a simple process involving a single failure mode is not consistent. For a modification of this process, a proof of consistency is sketched. Decision-theoretic studies of reliability growth have included investigations of the minimum-loss redesign policy, single-stage improvement models, and optimum effort for reliability growth. (Author)

AD-618 517 Div. 15/1, 16/4
CFSTI Prices: HC$3.00 MF$0.75

Rocketdyne, Canoga Park, Calif.
DESIGN, TESTING AND ESTIMATION IN COMPLEX EXPERIMENTATION. III. THE DESIGN AND ANALYSIS OF MULTIVARIATE SENSITIVITY EXPERIMENTS.
Final rept. for period ending Feb 65,
by Madeline J. Alexander. Jun 65, 87p
Rept. no. R-6078-3
Contract AF33 616 7372, Proj. 7071, Task 707101
ARL 65-116 P3

Unclassified report

Descriptors: (*Combinatorial analysis, Statistical analysis), (*Statistical analysis, Combinatorial analysis), Sensitivity, Sequential analysis, Probability, Stimulation.

This report contains research results obtained on the design and analysis of quantal-response experiments involving one or more stimuli. In particular a univariate nonparametric design for estimating the stimulus level corresponding to a given response-fraction, alpha, is developed. Special attention is given to extreme values of alpha. In addition, an algorithm for determining maximum-likelihood estimates of partially ordered probabilities and its application to various aspects of multivariate sensitivity experiments are described. A method for handling such experiments when the stimuli do not 'interact' is discussed and a nonparametric statistical design with point estimates is given. Finally, response models are developed for various conditional distribution requirements on the stimuli. For a large class of these response surfaces the equal-probability response contours are shown to be hyperbolas. (Author)

AD-618 518 Div. 15/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Rocketdyne, Canoga Park, Calif.
DESIGN, TESTING AND ESTIMATION IN COMPLEX EXPERIMENTATION. IV. A COMPUTER ROUTINE FOR EVALUATING INCOMPLETE FACTORIAL DESIGNS,
by S. R. Webb and S. W. Galley. Jun 65, 75p
Rept. no. R-6078-4
Contract AF33 616 7372, Proj. 7071, Task 707101
ARL 65-116 P4

Unclassified report

Descriptors: (*Combinatorial analysis, Effectiveness), (*Programming(Computers), Combinatorial analysis), Programming languages, Optimization, Operations research, Statistical analysis.

A computer program for the evaluation of incomplete factorial experimental designs for a specified experimental situation is described. This program allows any number of alternative designs to be compared on the basis of variance of alias characteristics with a minimum of effort. Several different models, which differ in the interactions to be estimated, may be used. The designs may have up to 64 runs, and up to 64 parameters may be estimated; however, detailed instructions are included on how these and other limitations may be changed. The program takes a maximum of 1 minute of execution time per design-model combination, but for a moderate number of parameters takes much less (3 seconds for 25 parameters). It is programmed in the Fortran IV system for the I.B.M. 7094 computer. (Author)

AD-618 524 Div. 15/2
CFSTI Prices: HC$2.00 MF$0.50

Purdue Univ., Lafayette, Ind.
ON SOME SELECTION AND RANKING PROCEDURES FOR MULTIVARIATE NORMAL POPULATIONS USING DISTANCE FUNCTIONS.
Technical rept.,
by Shanti S. Gupta. Jun 65, 35p
Mimeograph Series no. MS-43
Contract AF33 657 11737 Unclassified report

Descriptors: (*Decision theory, Population(Mathematics)), (*Statistical analysis, Population(Mathematics)), Statistical functions.

AD-618 525 Div. 15/2
CFSTI Prices: HC$3.00 MF$0.75

Purdue Univ., Lafayette, Ind.
MULTIPLE DECISION PROCEDURES FROM AN EMPIRICAL BAYES APPROACH.
Technical rept.
by John J. Deely. Jul 65, 88p Mimeograph Series no. MS-45
Contracts AF33 657 11737, Nonr110026

Unclassified report

Descriptors: (*Decision theory, Optimization), Population(Mathematics), Statistical analysis.

AD-618 529 Div. 15/2
CFSTI Prices: HC$1.00 MF$0.50

Purdue Univ., Lafayette, Ind.

A GENERAL CLASS OF BULK QUEUES WITH POISSON INPUT.
Technical rept.
by Marcel F. Neuts. Jun 65, 25p
Mimeograph Series no. MS-46
Contract Nonr110026

Unclassified report

Descriptors: (*Queuing theory, Statistical processes), Operations research, Probability, Integral transforms.

AD-618 530 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Purdue Univ., Lafayette, Ind.
AN ALTERNATIVE PROOF OF A THEOREM OF TAKACS ON THE GI/M/1 QUEUE.
Technical rept.,
by Marcel F. Neuts. Jun 65, 8p
Mimeograph series no. 47
Contract Nonr110026

Unclassified report

Descriptors: (*Queueing theory, Distribution theory), Probability, Measure theory, Fourier analysis, Integral equations, Differential equations.

An analytic proof is given of the fact that the stationary distribution for the imbedded Markov chain in a GI/M/1 queue is geometric. A generating function for the stationary transition probabilities is obtained as the unique solution to an integro-differential equation, which may be solved by reduction to a Wiener-Hopf equation. (Author)

AD-618 556 Div. 15/1, 30/2
CFSTI Prices: HC$2.00 MF$0.50

North Carolina State Univ., Raleigh.
A COMPUTER METHOD FOR DETERMINING THE MINIMAL POLYNOMIAL OF A MATRIX.
Master's thesis,
by Richard Joseph Latshaw. 1965, 38p

Unclassified report

Descriptors: (*Programming(Computers), Polynomials), (*Polynomials, Matrix algebra), (*Matrix algebra, Polynomials), Theorems.

The method provides a systematic means of determining the minimal polynomial of an n x n matrix A where the elements of A are taken from a finite or infinite field. A flow chart is given of the method suitable for computer programming.

AD-618 616 Div. 15/1

Polytechnic Inst. of Brooklyn, N. Y.
THE POINT AT INFINITY AND PERIODIC SOLUTIONS,
by Jane Cronin. 1965, 16p
Contract DA31 124ARO D56; Grant NSF GP165
AROD 2428:7

Unclassified report

Pub. in Journal of Differential Equations v1 n2 p156-70 Apr 1965 (Copies available only to DDC users).

Descriptors: (*Differential equations, Functional analysis), (*Functional analysis, Differential equation), Topology, Harmonic analysis.

Some practical criteria for stability of certain nonelementary critical points are obtained. The criteria are practical in the sense that elementary computations can be used to determine if a particular critical point of a given two-dimensional system satisfies the criteria. These criteria are obtained by reformulating certain results from the analysis of general critical points and adding certain topological and analytical considerations. The fact that the criteria obtained are really practical is then illustrated with some examples. The results are applied to the theory and limit cycles and periodic solutions are obtained and the existence of unbounded solutions of a particular kind is established. Periodic solutions for certain two-dimensional systems are obtained by using the concept of the line at infinity.

AD-618 619 Div. 15/1

Institute for Advanced Study, Princeton, N. J.
CONDITIONED DIFFERENTIABLE ISOTOPIES,
by William Huebsch and Marston Morse.
1964, 26p
Grants AF AFOSR357 63,NSF G19884
AFOSR 65-1041

Unclassified report

Pub. in Differential Analysis p1-25 1964 (Copies available only to DDC users).

Descriptors: (*Mapping(Transformations), Topology), (*Topology, Differential geometry), Functional analysis.

AD-618 620 Div. 15/1

Massachusetts Inst. of Tech., Cambridge.
A NECESSARY CONDITION FOR THE EXISTENCE OF BEST APPROXIMATIONS,
by B. R. Kripke and R. T. Rockafellar.
1958, 3p
Grant AF AFOSR62 348, Proj. 9749, Task 974901
AFOSR 65-1005

Unclassified report

Pub. in Journal of Mathematics and Mechanics v13 n6 p1037-8 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Functional analysis, Theorems), Topology, Convex sets, Numerical analysis.

AD-618 629 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CONSTRUCTION OF A SET OF SYSTEMS OF DIFFERENTIAL EQUATIONS DESCRIBING STABLE MOTION BY A GIVEN PROCEDURE,
by I. A. Mukhametzyanov. 12 Jul 65, 8p
Rept. no. FTD-TT-65-341
TT 65-62695

Unclassified report

Unedited rough draft trans. of Universitet Druzhby Narodov, Moscow. Trudy (USSR). v1 n1 p52-5 1963.

Descriptors: (*Differential equations, Motion), Trajectories, Numerical methods and procedures, Differential geometry, USSR.

13. Mechanical, Industrial, Civil, and Marine Engineering

AD-617 916 Div. 13/4
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
HORIZONTAL LOAD TESTS WITH A SEGMENTAL PILE.
Technical rept. for Aug 64-Mar 65,
by Henry L. Gill and Theodore R. Kretschmer.
Jul 65, 47p Rept. no. TR-R-386
Proj. Y F015 15 01 009

Unclassified report

Descriptors: (*Foundations(Structures), Test equipment), (*Soils, Loading(Mechanics)), (*Test equipment, Loading-(Mechanics)), Force(Mechanics), Earth, Sand, Pressure, Shear stresses, Mechanical properties, Correlation techniques, Graphics, Measurement.

Two series of tests of soil horizontal bearing capacity were performed with a new testing apparatus called a segmental pile. The pile is in three segments and has all soil removed from its interior. Within a soil deposit, the middle segment is forced horizontally, and the loads and displacements are measured and recorded. Such tests were made in moist beach sand and in an undisturbed hydraulic fill of medium sand. The segmental pile was found to be a useful and convenient tool for studying the horizontal load-supporting characteristics of naturally placed, undisturbed soil deposits. (Author)

AD-617 954 Div. 13/4, 33/1, 28/3, 27/2, 27/1
CFSTI Prices: HC$1.00 MF$0.50

Bolt, Beranek and Newman, Inc., Los Angeles, Calif.
LAND USE PLANNING RELATING TO AIRCRAFT NOISE, APPENDIX A.
Technical rept.
May 65, 14p

Unclassified report

See also AD-615 015.

Descriptors: (*Airplane noise, Urban planning), (*Urban planning, Airplane noise), (*Airplane engine noise, Urban planning), Jet engine noise, Commercial planes, Civil aviation, Urban areas, Take-off, Landings, Site selection.

The appendix presents perceived noise level contours for the takeoff and landing operations of the following types of civil aircraft: (a) two and three engine, short and medium range turbojet and turbofan transports (b) multi-engine small business turbojet and turbofan aircraft (c) two-engine piston and turboprop aircraft, both transport and business. These contours permit the determination of the noise level in PNdB over a wide area beneath and off to the side of a flight path. The appendix also includes a runup noise contour for estimating the noise from ground runups of civil and military turbofan engines.

AD-618 006 Div. 13/3, 3/4
CFSTI Prices: HC$3.60 MF$0.50

Quartermaster Research and Engineering Command, Natick, Mass.
FEASIBILITY STUDY OF A FILTRATION UNIT FOR THE REMOVAL BY THE INDIVIDUAL OF CBR AGENTS FROM WATER.
Technical rept.,
by Morris R. Rogers and Arthur M. Kaplan. Jun 61, 38p Rept. no. CP-19
Proj. 7 65 01 003

Unclassified report

Descriptors: (*Water supplies, Decontamination), (*Radiological warfare agents, Water supplies), (*Chemical warfare agents, Water supplies), (*Biological warfare agents, Water supplies), Feasibility studies, Separation, Contamination, Filters(Fluid), Armed forces supplies.

The study has been undertaken to determine the feasibility of developing a small filtration unit for an individual to remove CBR agents from his water supply. A literature search indicates that laboratory and engineering studies have established the principles by which all three agents can be effectively removed from contaminated water. These methods include chlorination, sedimentation, coagulation, demineralization, and filtration. A simple filtration unit capable of removing or reducing the CBR agents in water to a safe level is considered feasible and could be used by the individual under emergency conditions to treat water supplies. (Author)

AD-618 018 Div. 26/1
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
THE APPLICATION OF ULTRASONICS TO WIRE DRAWING.
Quarterly progress rept. for 1 Jan-31 Mar 65,
by A. T. Robinson, J. C. Connelly, and L. M. Stayton.
May 65, 11p Rept. nos. TPR-339, NOTS-TP-3836
Task RRMA24 063 216 1R007 06 01

Unclassified report

See also AD-615 509.

Descriptors: (*Drawing(Machine processing), Ultrasonic radiation), (*Ultrasonic radiation, Drawing(Machine processing)), (*Wire, Drawing(Machine processing)), Copper, Tin coatings, Velocity, Force(Mechanics), Lubrication, Deformation.

Tin coated copper wire was reduced 38 percent with and without an ultrasonic radiation environment and at draw velocities up to 243 ft/min. Results show a decrease in draw force with increase in energy density to the wire. No effect was observed on draw force with increased draw velocity if energy density remained constant. (Author)

AD-618 022 Div. 13/1, 12/1, 25/8
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF BOILING WATER IN A POROUS MATERIAL AS A MEANS OF SEPARATING LIQUID AND VAPOR IN ZERO GRAVITY.
Master's thesis,
by Cecil Scott Boyd. Mar 65, 60p
Rept. no. GAM-65A/ME/65-1

Unclassified report

Descriptors: (*Boiling, Space environmental conditions), (*Space environmental conditions, Boilers), (*Porous materials, Heat transfer), (*Vaporization, Separation), Spaceborne, Gravity, Water, Vapors, Steam, Liquids, Aluminum, Particles, Low-pressure research, Heaters, Conductivity, Temperature.

The study consisted of an investigation of boiling water electrically in a bed of aluminum particles as a means of separating liquid and vapor in zero gravity. Successful separation of liquid and vapor against gravity indicates

similar success in zero gravity. Very small pressure drops (12 inches of water or less) were required to force the vapor against gravity. All flow rates tested were successful (11.6 gm/min to 78.6 gm/min) in producing both saturated and superheated vapor (204 F maximum superheat). Temperature probes indicated boiling occurred on aluminum particles near heaters and on heater surfaces. Conductivity of the bed was 12% that of solid aluminum. (Author)

AD-618 032 Div. 31/6
CFSTI Prices: HC$2.00 MF$0.50

Navy Experimental Diving Unit, Washington, D. C.
CARBON DIOXIDE ABSORPTION SYSTEMS FOR SCUBA. 2. THEORY AND APPLICATIONS OF A NOVEL, NON-CYLINDRICAL LOW-RESISTANCE, C02 ABSORPTION CANISTER FOR SCUBA.
Research rept.,
by M. W. Goodman and T. W. James. 15 Jun 65, 35p Rept. no. RR-4-65
Proj. SF011 06 05 R2, Task 11511

Unclassified report

Descriptors: (*Scuba divers, Breathing apparatus), (*Breathing apparatus, Underwater equipment), (*Carbon dioxide, Breathing apparatus), (*Absorption, Carbon dioxide), Diving, Pressure, Containers, Rectangular bodies, Design, Fluid flow, Life support, Respirators.

Results of underwater swimming experiences, breathing-machine experiments, and recompression-chamber testing to eleven atmospheres absolute pressure (330 feet sea water) with new SCUBA carbon dioxide absorption canisters are reported. Granular Baralyme was employed as the chemical absorbing agent. Certain comparisons, both of design and functional history, with conventional cylindrical canister systems are emphasized and analyzed, and theory of the low-resistance device is discussed. As a three-dimensional geometric solid, the essential canister shape is that of a frustum of a rectangular pyramid. In the two-dimensional aspect of greatest surface the canister perimeter presents as a truncated isosceles trapezoid. Inlet and exhaust hose fittings are situated near the extremes of the larger rectangular base of the canister. The acronyms FLATCAN and Flatcanister denote Flat, Low resistance, carbon dioxide Absorption, Trapezoidal Canisters. Mean delta and resistance results for nine cylindrical canisters (16 mechanical respirator experiments) are about 90% and 15% higher, respectively, than the comparable mean data for seven FLATCAN prototypes (15 respirator experiments). A Reynolds number comparison, measured with a Fisher t test, was significant at the 0.01 confidence level. Size and dimensional parameters have been empirically related to duration of satisfactory carbon-dioxide elimination from SCUBA systems. (Author)

AD-618 058 Div. 26/6, 14/8
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
WEAR RESISTANCE OF POLYFORMALDEHYDE IN SLEEVE BEARINGS,
by V. N. Kestelman, D. I. Feldman, and N. Ya. Kestelman. 9 Jul 65, 8p Rept. no. FTD-TT-65-329
TT 65-62642

Unclassified report

Pub. in Plasticheskie Massy (USSR) n7 p65-6 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Bearings, Plastics), (*Plastics, Wear resistance), (*Formaldehyde, Plastics), USSR, Friction, Nylon, Bushings, Cermets, Performance-(Engineering), Journal bearings, Stability.

Tests showed, that sleeve bearings made of PFA are 3-4 times more wear resistant than caprone bearings, and 1.5 to 2 times than ceramet bushings and bearings. PFA bearings retain stability of dimensions and assure reliable operation of friction units.

AD-618 061 Div. 26/8, 9/1
CFSTI Prices: HC$7.15 MF$2.00

Foreign Technology Div., Wright-Patterson AFB, Ohio.
PNEUMATIC AND HYDRAULIC AUTOMATION,
ed. by M. A. Aizerman. 30 Jun 65, 414p
Rept. no. FTD-TT-65-169
TT 65-62645

Unclassified report

Unedited rough draft trans. of mono. Pnevmo- i Gidroavtomatika, Moscow, 1964, 264p.
Papers presented at the Seminar on Pneumatic and Hydraulic Automatic Elements (5th), Leningrad, Jun 62.

Descriptors: (*Control systems, Fluid flow), (*Hydraulic systems, Control systems), (*Pneumatic systems, Control systems), Automation, Servomechanisms, USSR.

Contents: Universal system of elements for industrial pneumatic automation (USEPPA); Pneumatic relay circuits; Regulators and optimizers; Transducers and converters; Centralized monitoring and control systems; Hydraulic drives; General problems of hydraulic automation.

AD-618 070 Div. 26/6, 26/5, 26/4
CFSTI Prices: HC$3.00 MF$0.75

Air Force Weapons Lab., Kirtland AFB, N. Mex.
IN-HOUSE VALUE ENGINEERING.
Technical rept. for 1 May 64-1 Apr 65,
by Raymond J. Swain. Jun 65, 98p
Rept. no. WL-TR-65-70
Proj. 5704, Task 570402

Unclassified report

Descriptors: (*Costs, Defense systems), (*Machining, Costs), Maintainability, Reliability, Design, Quality control, Performance(Engineering), Production, Manufacturing methods, Machine tools, Standards, Engineering.

Value Engineering (VE) is an organized effort directed toward achieving the required function of defense hardware at the lowest overall cost. Defense hardware items are especially amenable to the VE process since the methods used in their development often lead to massive unnecessary costs. A thorough VE program can reduce the cost of most existing designs by 40 percent. The basic process of VE begins with product selection. Next the function of the entire assembly and each part within the assembly are listed (using one verb and one noun only). The next step is the gathering of all possible information on the design including a complete cost breakdown on all parts. At this point alternatives are proposed to accomplish the required function (including maintainability and reliability) of the item. This is a highly creative process and group efforts, such as brainstorming, can be employed to advantage. The objective is to include in the list the simplest possible methods of accomplishing the required function and to utilize methods with the lowest possible manufacturing cost. The historical and theoretical value standards are quite useful here

and in making a thorough cost analysis of all workable alternatives. Those alternatives that are seen to result in significant saving are tested to verify that they fulfill all functional requirements. The final step is proposal submission and necessary follow-up to implement any design changes. (Author)

AD-618 075 Div. 26/2
CFSTI Prices: HC$4.00 MF$1.25

Planning Research Corp., Los Angeles, Calif.
Information Systems Div.
USE OF AIR FORCE ADPS EXPERIENCE IN JUDGING PROPOSALS FOR NEW AUTOMATION.
Technical rept.,
by Alan J. Gradwohl, Michael R. Lackner, William A. Rosen, and Wayne V. Shelton. Mar 65, 135p
Contract AF19 628 4979, Proj. 7990, Task 38
ESD TR-65-277
Unclassified report

Descriptors: (*Management planning, Air Force), (*Data processing systems, Air Force), (*Air Force, Data processing systems), Automation, Systems engineering, Decision making, Costs, Manpower studies, Job analysis, Air force personnel, Mathematical models, Effectiveness, Information retrieval, Classification, Abstracting, Measurement.

The objectives of this study were (1) synthesis of a concept for using Air Force ADPS experience to aid Air Force management in judging proposals for new automation, and (2) specification of an implementation plan for validating and refining the concept by application to a subset of Air Force ADP systems during Phase II. This report satisfies the above objectives. The key assumption underlying the concept developed is that the workload of the ADPS (e.g., volume and variety of inputs, size and complexity of data base, response time) is the primary casual factor for the cost and development time of the ADPS. A distillation of Air Force ADPS experience will be provided to Air Force management for validating performance, cost, and development time estimates in proposals for new automation. This compendium of ADPS experience will contain (1) highly distilled quantitative and qualitative summaries giving the current status and implementation/operations histories of ADP systems with workloads similar to that of the proposed automation, and (2) general ADPS planning factors showing the quantitative relationships between ADPS workload, costs, and development time. (Author)

AD-618 199 Div. 31/6, 16/1, 30/4
CFSTI Prices: HC$3.00 MF$0.75

Office of Naval Research, Washington, D. C.
AN EXFERIMENTAL ELEVEN-DAY UNDERSEA SATURATION DIVE AT 193 FEET.
Summary rept.,
by H. A. O'Neal, G. Bond, R. Lanphear, and T. Odum.
14 Jun 65, 66p Rept. no. ONR-ACR-108
Projs. NR290 000, RR011 05 05
Unclassified report

Rept. on Proj. Sealab.

Descriptors: (*Laboratories, Underwater), (*Adaptation-(Physiology), Diving), (*Diving, Adaptation(Physiology)), Oceanographic equipment, Underwater equipment, Ocean bottom, Life support, Stress(Physiology), Swimming, Decompression, Hematology, Psychology, Tolerances-(Physiology).

An undersea, ambient-pressure, gas-filled, nine-foot-diameter by 40-ft-long laboratory was placed on the ocean floor off Argus Island near Bermuda. Four men occupied the laboratory. During this period of saturation 'diving' on a He-O2-N2 gas mixture, the men performed work, ate, and slept within the dry laboratory and made working swims in the ocean spaces surrounding the laboratory. Physiological observations and measurements were made of the laboratory occupants. The Sealab subjects reached a state of equilibrium (tissue saturation) with their breathing medium at depth during the first 24-hr period on the bottom. After this time, additional exposure did not increase the decompression schedule. Decompression time from a 'saturation' dive to 200 ft may be as little as 30 hr, depending on conditions. Sealab I project demonstrated: 1. That man can perform useful work at 200 ft and deeper with this technique of integrating the human more fully with his undersea environment, rather than having him make brief, expensive forays into it, always returning to surface pressure for his necessities of life. 2. No adverse physiological effects as a result of aquanaut exposure to the experimental conditions of the Sealab I project.

AD-618 207 Div. 31/5
CFSTI Prices: HC$2.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
ON A FREE FLOATING SHIP IN WAVES.
Flight sciences laboratory rept.,
by W. D. Kim. Jun 65, 47p Rept. nos. FSL-100, D1-82-0446
Unclassified report

Descriptors: (*Ships, Oscillation), (*Hydrodynamics, Ship hulls), Water waves, Buoyancy, Spheres, Ellipsoids, Pitch(Motion), Scattering, Moment of inertia, Boundary value problems, Equations.

The oscillatory forces on a free floating ship of spherical or ellipsoidal hull at zero forward speed in a head sea are evaluated for the modes of surge, heave, and pitch. The potential boundary-value problem consists of (a) the determination of the radiation potential which is due to the forced oscillation of a floating ship in a calm sea, and (b) the determination of the diffraction potential which is due to the scattering of oncoming waves on a ship fixed in the equilibrium position. Upon knowing the values of the radiation potential over the immersed surface of the ship, the hydrodynamic forces arising from the impingement of oncoming waves are evaluated using the Haskind relation. Thus, the dependencies of added mass, added moment of inertia, and damping coefficients on the frequency of the forced oscillation as well as on the frequency of the oncoming wave are shown. Finally, the equation of motion governing the oscillation of the freely floating ship is obtained through the synthesis of hydrodynamic forces in the radiation and diffraction problems. The frequency dependence of the two pertinent parameters occurring in the equation of motion, the amplitude ratio and the phase lag between the ship motion and the wave motion, is also established. (Author)

AD-618 210 Div. 26/6
CFSTI Prices: HC$1.00 MF$0.50

Franklin Inst. Research Labs., Philadelphia, Pa.
PRELIMINARY STUDY OF THE ELASTIC ORIFICE AS A FLOW CONTROL DEVICE IN GAS-LUBRICATED BEARINGS.
Interim technical rept.,
by P. Koch. Jun 65, 18p Rept. no. I-A2049-23
Contract Nonr234200, Proj. NR062 316
Unclassified report

Descriptors: (*Gas bearings, Orifices), (*Orifices, Control systems), (*Lubricants, Gas flow), (*Gas flow,

Control systems), Elasticity, Differential equations, Deformation, Boundary layer, Linear systems, Loading-(Mechanics), Pressure, Feasibility studies, Reduction.

The study was undertaken to determine the feasibility of using elastic orifices as flow control devices in externally pressurized, gas-lubricated bearings. When lubricant is supplied to a bearing through an orifice of fixed area, the gas volume flow, Q, tends to decrease as the bearing load increases, due to the resultant decrease in pressure ratio across the orifice. If an orifice made of rubber or some other elastic material of very low modulus could be designed such that its throat area increases as the pressure ratio decreases, this tendency to reduce flow might be partially offset or possibly reversed for the heavier loads. For lightly loaded conditions, where the pressure ratio across the orifice is large, a reduction in orifice area, due to this same elastic action would reduce flow and make the operation of the bearing more efficient.

AD-618 226 Div. 31/5, 9/4
CFSTI Prices: HC$2.00 MF$0.50

David Taylor Model Basin, Washington, D. C.
THE APPLICATION OF SLENDER BODY THEORY TO STEADY SHIP MOTION,
by E. O. Tuck. Jun 65, 38p Rept. no. 2008
Proj. S R001 01 01, Task 0401
Unclassified report

Descriptors: (*Ships, Motion), (*Slender bodies, Ships), Theory, Fluid flow, Water waves, Series, Integrals, Fourier analysis.

Three previously published papers on steady ship motion treated by slender body theory are reprinted, together with an introduction which summarizes the three papers and reviews other efforts in this field up to 1965. Suggestions are made for further work to remove present limitations of the theory. (Author)

AD-618 306 Div. 13/4
CFSTI Prices: HC$3.00 MF$0.75

Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
LONG CYLINDRICAL SHELL UNDER CONCENTRATED LOADS APPLIED TO A CENTRAL REINFORCING RING.
Scientific research rept.,
by Arnold Allentuch, Kevin Brady, and Joseph Kempner.
Apr 65, 78p Rept. no. PIBAL-680
Contract AF49 638 1360, Proj. 9782, Task 978201, AFOSR 65-0984
Unclassified report

Descriptors: (*Cylindrical bodies, Structural properties), (*Structural properties, Cylindrical bodies), (*Structural shells, Cylindrical bodies), Mathematical analysis, Differential equatons, Boundary value problems, Loading-(Mechanics), Stresses, Deformation, Pressure vessels, Load distribution, Rings.

The stresses and displacements are determined in an infinite circular cylindrical shell reinforced at its midlength by a single frame. Acting at the ends of a deter of the rng are two self-equilibrating radial forces and moments. Solutons are obtained using the Donnell shell differential equations, the Love-Reissner shell equations and the Flugge shell equatons. The numercal results indicate that the three solutons are n excellent agreement. Stress distributions and displacements n the shell are presented along three generators. They indicate high stresses in the neborhood of the ring. For the values of the parameters considered, these stresses become negligible at a distance from the ring of approximately 0.15 times the radius of the shell so that the length of shell which acts with the ring is 0.30 times the radius of the shell. Stress and displacement distributions in the circumferential direction are also presented for the shell and the ring. (Author)

AD-618 313 Div. 13/1, 25/8
CFSTI Prices: HC$2.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
HEAT POWER ENGINEERING (SELECTED ARTICLES),
by V. M. Biman and A. A. Vasserman. 8 Jun 65,
43p Rept. no. FTD-MT-64-461
TT 65-62656
Unclassified report

Edited machine trans. of Teploenergetika (USSR)
v10 n11 p2-12, 81-5 1963.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Boilers, Design), (*Air, Thermodynamics), High-temperature research, High-pressure research, Thermal properties, Equations of state, Volume.

Contents: Some problems in the designing of superpowerful singlepass boilers, by V. M. Biman; Thermodynamic properties of air to 1000C and 1000 Bar, by A. A. Vasserman.

AD-618 408 Div. 26/2, 15/2
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Dept. of Industrial Engineering.
ON THE OPTIMALITY OF (s,S) INVENTORY POLICIES: NEW CONDITIONS AND A NEW PROOF.
Technical rept.,
by Arthur F. Veinott, Jr. 15 Jul 65, 30p
Rept. no. TR-4
Contract Nonr22577, Proj. NR347 010
Unclassified report

See also PB-146 052.

Descriptors: (*Optimization, Inventory analysis), (*Inventory analysis, Stochastic processes), Inventory control, Model theory, Management planning.

Scarf has shown that the (s,S) policy is optimal for a class of discrete review dynamic nonstationary inventory models. In this paper a new proof of this result is found under new conditions which do not imply and are not implied by Scarf's hypotheses. We replace Scarf's hypothesis that the one period expected costs are convex by the weaker assumption that the negative of these expected costs are unimodal. In addition, the bounds on the optimal parameter values given by Veinott and Wagner are established for the present case. The bounds in a period are easily computed, and depend only upon the expected costs for that period. Moreover, simple conditions are given which ensure that the optimal parameter values in a given period equal their lower bounds. This result is exploited to derive a planning horizon theorem. (Author)

AD-618 418 Div. 31/5
CFSTI Prices: HC$3.00 MF$0.75

Institute of Engineering Research, Univ. of California, Berkeley.
MEASUREMENT OF PRESSURES AND HYDRODYNAMIC FORCES ON A SHIPLIKE MODEL OSCILLATING IN A FREE SURFACE.

Technical rept.,
by Hou-Wen Huang. Jan 65, 60p
Rept. no. NA-65-1
Contract Nonr22293, Proj. S R009 01 01
Unclassified report

Descriptors: (*Ship models, Fluid dynamic properties), (*Oscillation, Ship models), Pressure, Measurement, Hydrodynamics, Surfaces, Damping, Force(Mechanics), Ship hulls.

A shiplike model was forced to oscillate in heave in still water to investigate the distribution of pressures, heaving forces, added-mass and damping coefficients along the length of the model. The heaving forces and phase angles measured at several sections are compared with values for corresponding two-dimensional cylinders of shiplike cross-sections calculated theoretically and experimentally confirmed. Results obtained from 3-dimensional theory and strip calculation are also provided for comparison. The total force, added-mass and damping coefficients are obtained in two ways: first, by direct force measurement and then, by integrating the vertical components of pressures over the wetted surface of the model. Reasonable agreement has been found between these two different approaches. (Author)

AD-618 419 Div. 31/4
CFSTI Prices: HC$3.00 MF$0.75

Vidya Div., Itek Corp., Palo Alto, Calif.
THEORETICAL PREDICTION OF VORTEX INTERFERENCE EFFECTS ON THE STATIC STABILITY OF A HIGH-SPEED SUBMARINE. PART I: ANALYSIS.
Interim technical rept.,
by Selden B. Spangler. 1 Feb 65, 92p
Vidya rept. no. 157
Contract Nonr393400, Projs. S R009 01 01, 9065
Unclassified report

Descriptors: (*Submarines, Stability), (*Hydrodynamics, Submarines), Vortices, Interference, Hydrostatics, Moments, Wake, Slender bodies, Submarine hulls, Angle of attack, Pitch(Motion), Roll, Mathematical prediction.

Methods are presented for theoretically predicting the forces and moments induced on the hull and stern control surfaces of a high-speed submarine by the vortex wake shed from the fairwater and fairwater planes at angles of attack, drift, and fairwater plane deflection. The methods are limited to those angles of attack and/or drift at which hull flow separation does not occur (the order of 10 degrees or less). The methods are applied to an assumed submarine configuration in order to illustrate the relative importance of the various vortex wake effects. For this purpose, forces and moments in the absence of vortex interference are predicted in order to obtain total forces and moments. Vortex interference effects induced by the fairwater plane wake at angle of attack are found to be negligible. Vortex interference effects are found to be small but not negligible for side force and to be appreciable for normal force, pitching moment, and rolling moment at angle of drift and for all forces and moments at combined angles of attack and drift. (Author)

AD-618 469 Div. 26/4, 8/2
CFSTI Prices: HC$5.00 MF$1.00

Honeywell, Inc., Minneapolis, Minn. Aeronautical Div.
NON-DESTRUCTIVE RELIABILITY SCREENING OF ELECTRONIC PARTS, USING RF NOISE MEASUREMENTS.
Final rept. for Dec 63-Dec 64,
by H. Avil, C. Maronde, and L. Kirvida. Jun 65, 176p
Contract AF30 602 3258, Proj. 5519, Task 551902
RADC TR-65-71
Unclassified report

Descriptors: (*Electronic equipment, Non-destructive testing), (*Non-destructive testing, Noise(Radio)), Diodes(Semiconductor), Silicon, Tantalum capacitors, Measurement, Reliability(Electronics), Life expectancy, Failure(Mechanics).

The report describes an investigation and evaluation of radio frequency (RF) noise in IN645 silicon diodes and solid tantalum capacitors. The specific intent of this effort was to establish and validate RF noise measurements as a technique for selecting and rejecting from a production lot of electronic parts those parts with lifetimes less than the average lifetime of the production lot, thereby increasing average lifetime and time to first failure. Large quantities of diodes and capacitors were screened; results are categorized and tabulated in this report. In addition to the screening effort, rejected components were life-tested with a control sample of good components, and efforts were made to optimize the screening technique. Also failure mechanisms that cause generation of RF noise were investigated both theoretically and experimentally. Findings of these investigations, as well as results of life test and screening optimization, are also presented in this final report. (Author)

AD-618 528 Div. 31/4, 9/4
CFSTI Prices: HC$2.00 MF$0.50

Oceanics, Inc., Plainview, N. Y.
POTENTIAL FLOW SOLUTION OF PROPELLER DRIVEN JETS USED FOR SUBMARINE DEPTH CONTROL,
by Theodore R. Goodman and C. C. Chen.
Jul 65, 34p Rept. no. 64-18a
Contract NObs90265, Proj. SF0130103, Task 0202
Unclassified report

Supersedes AD-611 367.

Descriptors: (*Submarines, Hydrodynamics), (*Jet propulsion, Submarines), Force(Mechanics), Propellers(Marine), Liquid jets, Underwater propulsion, Control systems, Depth indicators, Thrust, Submarine hulls, Momentum, Two-dimensional flow, Boundary value problems, Transformations(Mathematics), Mathematical models, Equations.

A two-dimensional potential flow analysis is performed of a submarine hull fitted with two symmetrically placed vertical open end tubes each containing a propeller. It is found that the thrust obtained is always less than the full jet momentum which would have been obtained had one end of the tube been closed. This occurs because the propeller must work to move the external fluid. The thrust is found to depend on tube location, and can be maximized by placing the tubes near the center of the hull, in which case two thirds of the full jet momentum is achieved. (Author)

AD-618 548 Div. 13/4
CFSTI Prices: HC$3.00 MF$0.75

Wyoming Univ., Laramie.
ACCELERATED STRENGTH TESTING OF LIGHTWEIGHT CONCRETE CYLINDERS.
Master's thesis,
by Oren G. Strom. Jun 65, 87p
Unclassified report

Descriptors: (*Concrete, Cylindrical bodies), (*Aging(Materials), Concrete), Test methods, Compressive properties.

Considerable effort has been made recently to develop an accelerated strength test for concrete, but virtually no work has been done with lightweight concrete or small cylindrical specimens. This work established that both conform satisfactorily to an accelerated strength test which can be conveniently employed for general concrete quality control. (Author)

AD-618 551 Div. 26/4, 26/3
CFSTI Prices: HC$4.00 MF$1.00

Virginia Polytechnic Inst., Blacksburg, Va.
AN INVESTIGATION INTO THE STABILITY OF PROCESS CAPABILITY FOR JOB LOT MANUFACTURING.
Master's thesis,
by Richard Hugh Steckler. Jul 65, 127p
Unclassified report

Descriptors: (*Quality control, Industrial production), (*Machining, Quality control), Production control, Statistical tests, Stability, Operators(Personnel), Performance-(Human), Tolerances(Mechanics), Lathes.

The study was made to collect the data and information necessary to make a decision about the stability of process capability in the generation of external lengths on engine lathes. Each set of data is obtained so that a statistical test can determine the significant contribution of operator skill level, machine condition, type of tolerance specified, and the nominal dimension in the range between 0.020 in to 0.522 in. All other factors in the processes will be held constant. The objective was to draw a statistical conclusion about the stability of the process capability in the range between 0.020 in to 0.522 in. A conclusion was also made as to the contribution of operator, machine, and type of tolerance to the inherent variation of the process.

AD-618 572 Div. 13/3, 16/6, 2/7
CFSTI Prices: HC$3.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge.
ATMOSPHERIC POLLUTION BY OZONE: ITS EFFECTS AND VARIABILITY.
Master's thesis,
by Henry William Brandi. May 65, 78p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Ozone, Air pollution), (*Air pollution, Ozone), Exhaust gases, Toxicity, Photochemistry, Upper atmosphere, Transport properties, Meters, Electrochemistry, Samplers, Urban areas, Gas filters, Chromium compounds, Oxides, Meteorological parameters, Halogens.

Surface ozone concentrations were measured in the Boston-Cambridge complex for the months of November and December, 1964 and January, 1965. The instrumentation used was a Mast ozone meter and recorder; a chromium trioxide filter was fitted to the air inlet of the meter to remove negatively interfering sulphur dioxide. The effectiveness of this filter was remarkably apparent in that removal of the filter caused ozone reductions of 50-100%. The overall range of ozone levels for the three months was 0.1 to 6.4 pphmv (part per hundred million by volume), well below toxic limits discussed in detail in this thesis. The average values for each of the three months indicate a possible correlation with the total ozone trend. Variation of the daily values is discussed with some meteorological factors as well as source strength. Seven simultaneous measurements of some of the halogens, obtained from a separate study by a colleague, are related to ozone concentrations. (Author)

AD-618 586 Div. 26/1, 17/7

Naval Ordnance Test Station, China Lake, Calif.
PERMEABILITY OF TUNGSTEN MATRICES AS A FUNCTION OF DENSITY, PARTICLE SIZE, AND SHAPE,
by Allen T. Robinson. 16 Apr 64, 12p
Rept. no. NOTS-TP-3859
Tasks RMMP23 082 216 1F009 06 03, RMMP21 001 216 1F009 01 16
NAVWEPS 8775
Unclassified report

Pub. in ASM Transactions Quarterly v57 n3 p650-7 Sep 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Tungsten, Powder metallurgy), (*Powder metallurgy, Tungsten), Permeability, Density, Particle size, Configuration, Powder metals, Porosity, Solutions, Viscosity.

Permeability measurements were made on tungsten compacts ranging from 63 to 81% of theoretical density, with fluids whose viscosities were selected to approximate those of molten metals. Permeability of spherical tungsten particle compacts (50, 100, and 420 microns) varied with particle size of the powder used to prepare the compact and the density of the compact, whereas permeability of granular tungsten particle compacts (10 to 30 microns) was a function of matrix density alone. (Author)

AD-618 628 Div. 26/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CHEMICAL MILLING,
by P. T. Rybak and V. V. Savich. 16 Jul 65, 7p
Rept. no. FTD-TT-65-865
TT 65-62694
Unclassified report

Unedited rough draft trans. of Mashinostroitel' (USSR) n3 p34-5 1964.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Chemical milling, Manufacturing methods), USSR, Printed circuits, Heating, Infrared radiation, Automation.

AD-618 673 Div. 31/5
CFSTI Prices: HC$4.00 MF$1.00

David Taylor Model Basin, Washington, D. C.
THREE-DIMENSIONAL (BEAM-SHELL-SPRUNG BODY) VIBRATION ANALYSIS OF NS SAVANNAH,
by Ralph C. Leibowitz and Robert G. Schwendler.
Apr 65, 135p Rept. no. 1728 Unclassified report

Descriptors: (*Ship hulls, Vibration), (*Cargo ships, Vibration), (*Nuclear powered vessels, Vibration), Beams(Structural), Mathematical analysis, Digital computers, Damping, Graphics.

The normal modes of coupled vertical, transverse, and longitudinal flexural vibrations and the steady-state damped response were calculated by means of a passive electrical-analog computer for surface ship NS SAVANNAH using a three-dimensional (beam-shell-sprung body) analysis similar to that applied to aircraft. This ship was selected as a case study because of the many test results, data, and calculations available for this ship. Vertical flexural vibrations based upon beam theory were also computed by a digital computer. To demonstrate the techniques involved in making a three-dimensional analysis, the methods and data used in the calculations and the results obtained are presented. Results show that significant reductions in vibration amplitudes can be achieved by such methods as damping or inertia coupling, which directly affect the sharpness of the structural resonance peaks. (Author)

14. Methods and Equipment

AD-617 915 Div. 30/3
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
A FLEXURAL FATIGUE MACHINE FOR HIGH-TEMPERATURE OPERATION AT RESONANCE IN VACUUM.
Interim rept.,
by M. R. Achter, H. H. Smith, R. L. Stegman, and R. J. Riley. 11 Jun 65, 17p NRL rept. no. 6275
Proj. RR007 01 46 5407

Unclassified report

Descriptors: (*Test equipment, Fatigue(Mechanics)), (*Fatigue(Mechanics), Test equipment), Vacuum apparatus, High-temperature research, Deformation, Resonance, Vibration, Fracture(Mechanics), Stainless steel, Nickel alloys, Chromium alloys, Titanium alloys, Damping, Feedback, Circuits.

A resonance type reversed-bending, high-temperature fatigue machine for operation at constant bending amplitude in vacuum has been developed. The vibration frequency is maintained at resonance by means of a feedback circuit employing a capacitance pickup. Another circuit maintains a constant amplitude of vibration. As fatigue cracks are developed, the resonant frequency is reduced. Curves of resonant frequency versus time at 800C for materials of high damping, such as Type 316 stainless steel, and for materials of low damping, such as Inconel X, illustrate the development of fatigue damage. (Author)

AD-618 072 Div. 30/3, 30/6
CFSTI Prices: HC$3.00 MF$0.75

Cincinnati Univ., Ohio.
FEASIBILITY STUDY OF TWO NULLING PRESSURE MEASURING SYSTEMS.
Interim technical rept. for Feb-Jul 63,
by David L. Brown. May 65, 67p
Contract AF33 616 8453, Proj. 7064
ARL 65-94

Unclassified report

Descriptors: (*Pressure gages, Feasibility studies), (*Wind tunnels, Pressure gages), Pressure switches, Electrostatics, Time-lag theory, Wind tunnel models, Dielectrics.

The purpose of the study was to investigate the feasibility of developing a pressure measuring system which operated on a nulling principle with nulling capabilities of 0.01 mm Hg. An additional specification employed was that the entire system be small enough to fit in a wind tunnel model or model support system in order to reduce the time-lag. Two systems were investigated. The first used a known pressure as the nulling medium and the second system utilized an electrostatic pressure for this purpose. A working model of the first system was developed and tested. However, attempts to develop a working model utilizing the latter principle were unsuccessful. (Author)

AD-618 225 Div. 30/3, 12/1
CFSTI Prices: HC$2.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
ALTIMETER FOR REENTRY VEHICLE. DESIGN PROPOSAL,
by Robert S. Goodman. 1 Jun 65, 36p
Rept. no. TM-65-29
Proj. 01500 Unclassified report

Descriptors: (*Radio altimeters, Reentry vehicles), (*Reentry vehicles, Radio altimeters), Height finding, Echo ranging, Design, Guided missiles components, Radar equipment, Range finding, Telemetering transmitters, Telemeter systems, Transponders, Guided missile trajectories, Monitors.

The report describes a proposed design of an altimeter system to give reentry altitude data and height-of-burst information. The intended application of the proposed system requires a missile-borne altimeter that is similar to the pulse-radar ranging device developed by HDL for the Pershing missile. The associated data acquisition station (DAS) must be capable of operating either ground based or airborne. Operation of the system proposed requires simply a transmitter and transponder contained in the reentry vehicle and a DAS located in either an airplane or surface station. The altitude data are recorded in digital form, together with an analog record of TM data. The recorded information is processed later by a computer. The design is based on a 40-ft system accuracy requirement and not on component limitation. Feasibility of the design concept has been proved in five flights under Pershing missile environment. The accuracy of the Pershing altimeter was approximately ±15 ft. A detailed description of the proposed altimeter design and its theory of operation are reported. (Author)

AD-618 271 Div. 30/4, 8/1

Army Electronics Labs., Fort Monmouth, N. J.
COMPACT ANECHOIC CHAMBER FOR PRODUCTION TESTING VHF ANTENNAS,
by Watson P. Czerwinski. 1965, 5p

Unclassified report

Pub. in IEEE Transactions on Product Engineering and Production p8-12 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Anechoic chambers, Test equipment), (*Antennas, Test methods), Very high frequency, Model tests, Electrical impedance, Environmental tests.

AD-618 293 Div. 30/3, 2/7
CFSTI Prices: HC$5.00 MF$1.00

Adcole Corp., Waltham, Mass.
ELECTRONIC INSTRUMENTATION FOR IONOSPHERIC AND EXTREME ULTRAVIOLET RADIATION MEASUREMENTS.
Final scientific rept. for 1963-1964,
by Robert S. Hills. 1 Mar 65, 161p
Contract AF19 628 2464, Projs. 6688, 6687, Tasks 668801, 668802
AFCRL 65-417

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Solar radiation, Measurement), (*Ultraviolet radiation, Solar radiation), (*Radiation measurement systems, Solar radiation), Sounding rockets, Scientific satellites, Instrumentation, Design, Manufacturing methods, Tests, Flight testing, Electronic equipment, Proportional counters, Telemeter systems, Calibration.

The report describes the design, construction, test and flight use of the electronic portions of research instruments used on rockets and satellites for the investigation of ultraviolet solar radiation. These instruments include grating monochromators for measurements in the 55 - 1300 Angstrom range and proportional counter spectrometers in

the 1 - 10 Angstrom range. Also described is work done on retarding potential analyzers used for analysis of environmental charged particles, including measurement of electron temperature. All the instruments are of a telemetering type. Associated equipment used for calibration and testing of the instruments in both the laboratory and the launch phases is described. Automatic data reduction equipment was developed and used successfully. Experiments involved OSO, OGO and Air Force satellites and Aerobee-150 and Black Brant rockets. (Author)

AD-618 339 Div. 30/3, 30/5

California Inst. of Tech., Pasadena.
APPARATUS FOR X-RAY DIFFRACTION STUDIES OF CONFINED FLUIDS,
by W. I. Honeywell, C. M. Knobler, B. L. Smith, and C. J. Pings. 1 Jun 64, 4p
Unclassified report

Pub. in Review of Scientific Instruments v35 n9 p1216-9 Sep 1964(Copies not available to DDC or Clearinghouse customers)

Supported by AFOSR and ONR.

Descriptors: (*Liquids, X-ray diffraction analysis), (*X-ray diffraction analysis, Laboratory equipment), Test methods, Instrumentation, Goniometers, Cryostats, Temperature, Control, Scattering, Fluids.

An apparatus is described for studies of the x-ray diffraction of liquids in the temperature range 80-300K and at pressures up to 100 atm. The device is compatible with a commercial gonimeter and is usable in both Debye-Scherrer and parafocusing geometries.

AD-618 368 Div. 30/5, 27/3, 10/6
CFSTI Prices: HC$3.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
MEASUREMENT OF PARTICAL VELOCITIES IN SUPERSONIC GAS STREAMS.
Technical publication,
by Richard D. Fulmer and David P. Wirtz. Dec 64, 52p Rept. no. NOTS-TP-3487
NAVWEPS 8505
Unclassified report

Descriptors: (*Test methods, Propulsion), (*Supersonic flow, Particles), (*Particles, Velocity), Measurement, Cameras, Photographic techniques, Light pulses, Helium group gases, Exhaust gases, Propellants.

A photographic technique was developed to directly measure the velocity of particles as small as 2-3 micron-diameter traveling at velocities up to 2,600 ft/sec in supersonic gas streams. A double-pulsed explosive-krypton light source was used to provide intense and precisely controlled light pulses that were used both for illuminating and shuttering the event. The particle images were recorded on film as pairs of streaks. The velocities of the particles were determined from the magnification of the camera-lens system, the measured distance between the streaks on the film, and the time interval between flashes. A series of ten runs was made in which the velocity of 3-50 micron particles were measured as they were carried in a 2,900 ft/sec helium stream. Particle velocities up to 2,600 ft/sec were measured with an accuracy of from 1.5 to 3.2%. By optimizing the technique it should be possible to extend the measurements to higher particle velocities. Particle velocities and sizes were correlated and the results compared with theoretical data calculated using a one-dimensional treatment with constant lag assumptions. Although the data trends correlate well, it appears that particle lag is not as great as predicted by theory. (Author)

AD-618 372 Div. 30/5, 17/2
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
OPTICAL TECHNIQUES FOR ELECTRON PROBE ANALYSIS.
Final rept.,
by J. Grosso. 28 May 65, 13p Rept. no. NRL-6290
Proj. RR002 02 41 4951
Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.

Descriptors: (*Electron microscopy, Metallography), (*Metallography, Microscopy), Optical analysis, Surface properties, Light transmission, Interference, Metals, Test methods, Microstructure.

This study is concerned with two techniques in optical microscopy which exploit the principle of light interference to enhance optical contrast in metallurgical specimens. The first method achieves this through interference layers formed within the specimen by anodization in an electrolyte. A variety of experimental arrangements are suggested for carrying out the anodization. It is also noted that the optical effects of anodization can be adjusted by overlaying the specimen with films of nitrocellulose. The second method produces optical contrast through interference layers formed by replicating the etched-out surface of the specimen. This latter technique has the advantage of being applicable to any specimen which can be etched, and it is not limited to anodizable species. Here too, the optical results of replication can be adjusted by exposing the replica to the vapors of its solvent. (Author)

AD-618 428 Div. 30/3

California Inst. of Tech., Pasadena.
APPARATUS FOR X-RAY DIFFRACTION STUDIES OF LIQUIDS,
by S. E. Rodriguez, R. W. Caputi, and C. J. Pings. 11 Dec 64, 5p
Unclassified report

Pub. in Review of Scientific Instruments v36 n4 p449-53 Apr 1965 (Copies not available to DDC or Clearinghouse customers)
Supported by AFOSR and ONR.

Descriptors: (*X-ray diffraction analysis, Instrumentation), (*Test equipment, X-ray diffraction analysis), (*Liquids, X-ray diffraction analysis), Goniometers, Diffraction, Surfaces, Reflection, Liquid metals, Gallium, Mercury, Containers, Plastics, Controlled atmospheres.

A sample enclosure compatible with the Norelco goniometer permits x-ray diffraction measurements on liquids confined under their own vapor pressure or an inert gas. Diffraction is in reflection-type geometry using a free liquid surface. The prototype, made of plastic, has been operated between 0 and 50C. (Author)

AD-618 453 Div. 30/3

Lincoln Lab., Mass. Inst. of Tech. Lexington.

OPTICAL PYROMETER MEASUREMENT OF RF POWER.
Revised ed.
by T. B. Reed and J. T. Roddy. 11 Jan 65, 2p
Unclassified report

Pub. in The Review of Scientific Instruments v36 n5 p620-1 May 1965
Revision of manuscript submitted 9 Nov 64
(Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Radiofrequency generators, Power meters), (*Pyrometers, Radiofrequency generators), Optical equipment, Test methods, Loading(Mechanics).

The power output of an RF generator coupled to a graphite cylinder can be conveniently measured by determining the equilibrium temperature of the cylinder with an optical pyrometer and using the blackbody formula to obtain the power radiated by the cylinder. This power was found to agree closely with the generator output measured with a conventional water-cooled calorimeter. Graphite, with a resistivity of about .001 ohm, easy machinability, and good blackbody characteristics, is an excellent dummy load for studying the output of RF generators to such relatively high resistivity loads as plasmas and semiconductors. The pyrometer method has also been used to determine the coupling efficiency of a generator as a function of the ratio of load diameter to coil diameter. Efficiencies of 27, 41, 59, and 63% were found for ratios of 0.46, 0.61, 0.77, and 0.92, respectively. (Author)

AD-618 483 Div. 30/5, 9/2, 22/4
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
A TECHNIQUE FOR STUDYING THE SHOCK-ON-SHOCK PROBLEM.
Flight sciences laboratory rept.,
by E. A. Brown, Jr. and G. J. Mullaney. Jun 65, 18p Rept. nos. FSL-99, D1-82-0445
Unclassified report

Also available from the authors.

Descriptors: (*Shock waves, Projectiles), (*Terminal ballistics, Test methods), (*Supersonic characteristics, Shock waves), Supersonic flow, Shock tubes, Conical bodies, Cylindrical bodies, Reentry vehicles, Model tests, Wake.

A new technique for studying the interaction of a blast wave with a supersonic projectile is described. A conventional shock tube was combined with a ballistic range by installing a smooth bore powder gun in the dump chamber and firing .300 caliber cone-cylinder projectiles toward the driver. The velocity of the projectile, fired into air at 100 mm Hg, was measured near the muzzle and a computer used to provide a proportional time delay before the shock wave was started down the tube. The projectile and the shock wave, each traveling at about 4000 feet per second, met in a 3-inch diameter window. Two spark light sources were used for shadow photography of the interaction. Typical interaction photographs are shown. (Author)

AD-618 501 Div. 30/4, 26/1, 14/6
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
GLASS FIBER DRAWING AND MEASURING FACILITIES AT THE U. S. NAVAL ORDNANCE LABORATORY.
Technical rept.,
by Joy R. Fisher. Aug 65, 41p
Rept. no. NOL-TR-65-87
Task RRMA03 043 212 1R007 04 01
Unclassified report

Descriptors: (*Ordnance laboratories, Drawing-(Machine processing)), (*Drawing(Machine processing), Glass textiles), (*Glass textiles, Drawing(Machine processing)), Laboratory equipment, Laboratory furnaces, Measurement, Tensile properties, Density, Elasticity, Filaments, Winding, Composite materials, Plastics, Filament wound construction.

Glass fiber drawing facilities and apparatus for measuring the physical properties of these fibers have been assembled at NOL for research and development purposes. The fiber drawing facilities include a small wire wound furnace for preliminary studies and a high amperage furnace for longer ranged research programs, such as a study of the effect of finishes on the strength of glass-resin composites. Measurement facilities are provided for determining the following properties of glass fibers: diameter, density, tensile strength, and modulus of elasticity. Alternative methods for measuring diameter and density are also given. (Author)

AD-618 532 Div. 30/5
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
METHODS OF HIGH-TEMPERATURE MEASUREMENT OF GASES: COMPILATION OF ABSTRACTS.
Rept. no. 3.
22 Jul 65, 14p Rept. no. ATD-P-65-53
TT 65-62677
Unclassified report

Rept. on Surveys of Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Gases, High-temperature research), (*Test methods, Gases), (*Temperature, Gases), Abstracting, Bibliographies, Spectrum analyzers, Flames, Gas flow, Plasma medium, Resistance thermometers, Measurement.

AD-618 561 Div. 30/5
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
STATE-OF-THE-ART PROJECTION AND LONG-RANGE PLANNING OF APPLIED RESEARCH,
by F. S. Pardee. Jul 65, 25p Rept. no. P-3181
Unclassified report

Prepared for presentation at the Conference on Research Program Effectiveness (2nd), sponsored by the Office of Naval Research, Washington, D. C., 27-29 Jul 65.

Descriptors: (*Armed forces research, Management planning), (*Research program administration, Armed forces research), Reviews, Probability, Weapon systems, Systems engineering, Operations research, Feasibility studies.

The objective is an improved means of communicating reliable, well-documented estimates on anticipated technical progress from applied research scientists to weapon system engineers and other concerned decision-makers.

AD-618 566 Div. 30/5
CFSTI Prices: HC$2.00 MF$0.50

Midwest Research Inst., Kansas City, Mo.

HIGH-PRESSURE SAMPLING CONFERENCE REPORT.
Technical rept. for 6-7 May 65,
by Thomas A. Milne. 23 Jul 65, 38p
Contract Nonr359900, Proj. NR092 513, ARPA Order 23 63

Unclassified report

Descriptors: (*High-pressure research, Sampling), (*Sampling, Symposia), Molecular beams, Ions, Flames, Shock tubes, Plasma medium, Magnetic resonance, Mass spectroscopy, Nucleation, Fluid mechanics, Free radicals.

The meeting, under the joint sponsorship of the Office of Naval Research through project SQUID and Midwest Research Institute, was held to bring together a small group with a variety of interests and experience bearing on the problems encountered in the direct sampling of systems at high pressures. The purpose of the report is to list the program and attendees at this informal meeting. No publications of the proceedings of the meeting will be made. However, abstracts of the talks are included to indicate the range of topics covered. The list of attendees serves as a source of detailed information on particular aspects of sampling and related phenomena. (Author)

AD-618 636 Div. 30/5, 25/2, 17/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ON METHODS OF MEASUREMENT OF MICRO-HARDNESS ON ANISOTROPIC CRYSTALS,
by V. A. Kokoshkin. 14 Jul 65, 15p
Rept. no. FTD-TT-65-254
TT 65-62700

Unclassified report

Edited trans. of Akademiya Nauk SSSR, Institut Metallurgii, Moscow. Trudy. n11 p114-9 1962.

Descriptors: (*Hardness, Crystal structure), (*Crystals, Hardness), (*Test methods, Hardness), USSR, Anisotropy, Measurement, Deformation, Crystal lattice defects, Fracture(Mechanics).

The study of hardness on anisotropic crystals with the help of appropriate specially shaped indenters will make it possible to refer the measured value to definite crystallographic planes. It is most expedient to relate measurements of hardness with the glide planes (or cleavage planes), since these planes play the main role in development of deformation of a crystalline anisotropic body. It is natural to characterize microhardness by average contact pressure or average specific work of deformation; therefore, there should be observed the requirement of maximum conformity between the shapes of the indenter and of the indentation. Measurement of microhardness on basal crystallographic planes with the help of special indenters makes it possible to attain the most complete conformity. Special indenters also make it possible to considerably decrease errors of measurements which are due to distortion of the shape of the indentations, the appearance of cracks, and so forth. Furthermore, reproductibility of results will be increased, since for crystals of many crystallographic systems there will be required indenters in the shape of a regular trihedral pyramid, the accuracy of manufacture of which is very high. (Author)

AD-618 637 Div. 30/4, 2/7
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
WEATHER INDUSTRY,
by Ya. Golovanov. 16 Jul 65, 6p
Rept. no. FTD-TT-65-836
TT 65-62701

Unclassified report

Unedited rough draft trans. of Sovetskaya Moldaviya (USSR) 1964, 11 Jul, p3.

Descriptors: (*Meteorology, Laboratories), (*Laboratories, Meteorology), (*Clouds, Controlled atmospheres), Wind tunnels, Aerosols, Meteorological phenomena, Fog, USSR, Test facilities.

AD-618 640 Div. 24/2, 12/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EXPERIENCE OF TRACKING WITH THE NAFA-3S/25 CAMERA,
by A. G. Krylov. 25 May 65, 10p Rept. no. FTD-TT-65-115
TT 65-62704

Unclassified report

Unedited rough draft trans. of Byulleten' Stantsii Opticheskogo Nablyudeniya Iskusstvennykh Sputnikov Zemli (USSR) n29 p33-7 1962.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Tracking, Satellites(Artificial)), (*Tracking cameras, Operation), USSR, Effectiveness, Photographic techniques.

AD-618 646 Div. 30/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CALIBRATION RACK,
by V. I. Zimenkov. 14 Jul 65, 5p
Rept. no. FTD-TT-65-232
TT 65-62710

Unclassified report

Unedited rough draft trans. of Russian patent 152115, pub 10 Feb 62, appl. 764417/26-10.

Descriptors: (*Calibration, Balances), (*Balances, Calibration), Test equipment, Measurement, USSR.

The object of the invention is a calibrating rack for measuring instruments, for example, of a wind-tunnel balance, which contains loads suspended on flexible filaments passed over rollers. The precision of the measurement of the forces is improved by a thread connected with the instrument to be calibrated which tightens the filaments of suspension of various loads. The points of suspension of the various loads are fastened on a horizontal bar elastically connected with the basic stand and shifted in the axial direction by the difference of the loads on the platforms (disks on which the weights rest). (Author)

AD-618 676 Div. 30/5, 20/2, 30/3
CFSTI Prices: HC$3.00 MF$0.75

Naval Ordnance Lab., White Oak, Md.
APPLICATION OF AN ANTICOINCIDENCE-SHIELDED SCINTILLATION SPECTROMETER TO THE STUDY OF THE N14(p,GAMMA)015 REACTION.
Technical rept.,

by Albert E. Evans, Jr. 11 May 65, 82p
Rept. no. NOL-TR-65-72
Task FR-43

Unclassified report

Descriptors: (*Spectrum analyzers, Gamma-ray spectra), (*Gamma-ray spectra, Gamma-proton reactions), (*Proton capture, Nitrogen), Gamma emission, Oxygen, Proton bombardment, Scintillation counters, Photomultipliers, Pulse height analyzers, Nuclear energy levels.

A gamma-ray spectrometer was built using a liquid-scintillator anticoincidence shield for a 5 in dia x 10 in long NaI(T1) crystal. The spectrometer was used to study radiation from the N14(p, gamma)015 reaction for proton energies of from 0.97 to 1.96 MeV. Decay schemes for the 8.29, 8.75, 8.92, and 8.98 Mev levels in 015 were derived. (Author)

15. Military Sciences

AD-617 953 Div. 18/3
CFSTI Prices: HC$8.70 MF$2.50

Bureau of Supplies and Accounts, Navy Dept., Washington, D. C.
OPERATIONS AND ORGANIZATION OF THE GERMAN NAVAL SUPPLY SYSTEM DURING WORLD WAR II.
Special rept.
1949, 568p Pub. no. NAVSANDA-267
Unclassified report

Descriptors: (*Armed forces supplies, Armed forces(Foreign)), (*Naval operations, Armed forces(Foreign)), (*Logistics, Armed forces(Foreign)), (*Armed forces(Foreign), Navy), Officer personnel, Naval personnel, Fuels, Transportation, Costs, Clothing, Naval procurement, Storage, Distribution, Enemy personnel.

The purpose of the report on operations and organization of the German naval supply system during World War II is to disseminate the information to interested persons of the Naval Establishment. Subjects included relate to the German navy during World War II and cover organization, supply-officers and officials, the logistic system, mobile support, procurement, storage and distribution, fuel, transportation, finance, fiscal accounting and mutual assistance, clothing, small stores, provisions and ships store activities, and the secret supply service.

AD-618 033 Div. 18/3, 26/1, 30/2
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
A PROGRAM LIBRARY APPROACH FOR IMPLEMENTING RESULTS OF LOGISTICS RESEARCH,
by Andrew J. Clark. Jul 65, 49p
Memo. no. RM-4615-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Logistics, Management control systems), (*Management control systems, Logistics), (*Inventory control, Logistics), (*Libraries, Inventory control), Computers, Programming(Computers), Costs.

A method for narrowing the gap between research in inventory theory and its use in operational systems is presented. It is proposed that a library be established, consisting of self-contained computer routines that can be used in desired combinations by system designers who are not specialists in applied inventory theory. A possible structure of the library is suggested in terms of kinds and scope of routines that might be included. Suggestions are made on how the library might be established and administered. Examples of routines that might be considered for inclusion in the library are presented in appendices. (Author)

AD-618 273 Div. 18/4

Army Electronics Labs., Fort Monmouth, N. J.
THE ROLE OF LARGE-SCALE SIMULATION IN THE PROGRAM DEFINITION PHASE ENVIRONMENT: AN EXAMPLE.
Revised ed.,
by William J. Kenneally. 23 Nov 64, 7p
Unclassified report

Pub. in IEEE Transactions on Military Electronics vMIL9 n2 P163-71 Apr 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript dated 4 Nov 64.

Descriptors: (*Programming(Computers), Systems engineering), (*Systems engineering, Armed forces operations), Operations research, Management planning, Weapon systems, Tactical weapons.

The role of the Government Laboratory in the Program Definition Phase (PDP) environment is discussed. Emphasis is placed on the dual task of defining the technical boundaries of the problem, and evaluating the PDP reports to select the most acceptable engineering approach. The problem of accomplishing a detailed technical evaluation of several proposed approaches in a short time frame is examined, with the result that a requirement for a better 'yardstick' is established. Design decisions leading to the final specification of such a yardstick--the Tactical Avionics System Simulator (TASS)--and a summary of its anticipated capabilities are presented. (Author)

AD-618 321 Div. 18/5, 26/2
CFSTI Prices: HC$5.00 MF$1.25

Little (Arthur D.) Inc., Cambridge, Mass.
MANAGEMENT FACTORS AFFECTING RESEARCH AND EXPLORATORY DEVELOPMENT.
Apr 65, 186p
Contract SD235
Unclassified report

Descriptors: (*Department of Defense, Management control systems), (*Management control systems, Armed forces research), (*Armed forces research, Weapon systems), Guided missiles, Research program administration, Personnel management.

The primary objective of the study is to discover circumstances which the Defense Department could manipulate or control, and which favor the initiation, execution, and utilization of research and exploratory development projects.

AD-618 361 Div. 18/7, 20/7, 20/2, 32/8
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
FOREWARD TO THE JAPANESE EDITION OF 'COMMUNIST CHINA'S STRATEGY IN THE NUCLEAR ERA': IMPLICATIONS OF THE CHINESE NUCLEAR DETONATIONS,
by Alice L. Hsieh. Jun 65, 24p Rept. no. P-3152
Unclassified report

Descriptors: (*Nuclear explosions, China), (*China, Nuclear explosions), (*Military strategy, China), Communism, Nuclear weapons, Nuclear bombs, Nuclear warfare, Limited war, Political science, Propaganda, Foreign policy, Reviews, Japan.

AD-618 364 Div. 18/1, 26/2
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
A SUGGESTED METHOD FOR INTEGRATION OF MAJOR CONTRACTOR FINANCIAL REPORTING REQUIREMENTS,
by D. K. Whitcomb. Jun 65, 87p
Memo. no. RM-4519-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Weapon systems, Costs), (*Air force procurement, Weapon systems), (*Management plan-

ning, Air force procurement), (*Armed forces budgets, Weapon systems), Military requirements, Data processing systems, Systems engineering, Management control systems, Defense systems, Air force systems command, Department of Defense.

The report presents a description of an integrated information system for contractor cost reporting, which is proposed to meet the need for a unified system of collecting financial information covering long-range planning, program control, and historical record-keeping (data bank) functions in weapon system development. The system provides a condensed yet comprehensive report package through combination and condensation of the reporting requirements included primarily in the AFSC Contractor Cost Study, the PERT-Cost System, and the Defense Contractors' Planning Report. Major specifications of a single underlying data collection system capable of producing all the required formats are presented. (Author)

AD-618 365 Div. 18/1, 26/2
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
DEFENSE CONTRACTS: AN ANALYSIS OF ADAPTIVE RESPONSE,
by Oliver E. Williamson. Jun 65, 70p
Memo. no. RM-4363-PR
Contract A49 638 700
Unclassified report

Descriptors: (*Weapon systems, Costs), (*Armed forces budgets, Weapon systems), (*Management control systems, Armed forces procurement), (*Armed forces procurement, Costs), Defense systems, Industries, Management planning, Mathematical models.

A study is presented of the methods by which the Air Force and other government departments can keep development contract costs within reasonable bounds. The role of task uncertainty in the problem of contract cost control is emphasized, and it is argued that in many situations the adaptive responses of the firm can vitiate the effects of contractual arrangements aimed at reducing costs through profit-sharing incentives. The analysis concludes that one of the most effective ways to strengthen cost controls is to reduce the task uncertainty associated with contract negotiations. An adaptive response model is presented in an appendix. (Author)

AD-618 367 Div. 18/1, 18/7, 15/1
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
A PRELIMINARY TREATMENT OF MOBILE SLBM DEFENSE: A GAME THEORETIC ANALYSIS,
by Ralph Strauch. Jun 65, 29p Memo. no. RM-4439-ARPA
Contract SD-79, ARPA Order 189-61
Unclassified report

Descriptors: (*Game theory, Defense systems), (*Defense systems, Deployment), Submarines, Undersea warfare, Antisubmarine warfare, Military strategy, Mobile.

The report contains a game analysis of the deployment of a defense system against submarine-launched ballistic missiles composed of mobile defense units capable of destroying a nearby submarine and its missiles at the time of launch. The memorandum assumes that the ocean is divided into zones among which both the attacker and defender deploy forces. (Author)

AD-618 414 Div. 18/1, 20/2, 13/11
CFSTI Prices: HC$2.00 MF$0.50

IIT Research Inst., Chicago, Ill.
FIRE BEHAVIOR, IGNITION TO FLASHOVER.
Final summary rept.,
by F. J. Vodvarka and T. E. Waterman. Jun 65, 48p
Rept. no. N6059
Contract OCD PS64 50, Tasks 2C, 2536C
Unclassified report

Descriptors: (*Nuclear explosion damage, Fires), (*Fires, Nuclear explosion damage), Ignition, Fire extinguishers, Civil defense systems, Scientific research.

The program studied fire buildup resulting from flaming ignitions of major furniture items in simulated residential rooms. Times were determined for fires to develop beyond elementary extinguishment techniques and for flashover to occur. The data provide information for determining personnel requirements for civil defense fire fighting teams and brigades. In rooms with conventional upholstery, in rooms with foam rubber upholstery, and in bedrooms with box springs, 90 per cent of the fuel developed beyond self-help extinguishment capabilities in 26, 8 and 12 minutes, respectively. Bedrooms with open springs did not flash over. (Author)

AD-618 550 Div. 18/2, 32/8
CFSTI Prices: HC$4.00 MF$1.00

Oklahoma Univ., Norman.
COLD WAR CENSORSHIP: GUIDELINES FOR CENSORSHIP DURING LIMITED MILITARY ACTIONS.
Master's thesis,
by Donald Hilkemeier. 1965, 124p
Unclassified report

Descriptors: (*Political science, Military intelligence), (*Military intelligence, Cold war), (*Limited war, Newspapers), (*Newspapers, Limited war), Military requirements, Handbooks, History.

16. Missile Technology

AD-618 570 Div. 12/1, 9/6, 9/2
CFSTI Prices: HC$5.00 MF$1.25

Oklahoma State Univ., Stillwater.
TRANSIENT FLOW FIELD ANALYSIS OF A PLANE BLAST WAVE INTERCEPTING A STATIONARY CONE AT ZERO ANGLE OF ATTACK,
Doctoral thesis,
by William N. Jackomis. May 65, 194p
Unclassified report

Descriptors: (*Shock waves, Conical bodies), (*Guided missiles, Blast), Numerical analysis, Differential equations, Wake, Separation, Jet mixing flow, Reviews, Three-dimensional flow.

A method for the transient analysis for the stationary cone was developed. Extensions of several methods were utilized and made compatible with existing flow conditions to provide a continuous flow solution. Whitham's approximate solution was used to obtain the shock diffraction pattern past the forebody. The results of the blast-base interaction solution was used to mate the blast passage with the formation of the separated flow region behind the body. It is shown that the steady-state base flow studies of Zumwalt and Tang provided the method used to accomplish this. The use of Zumwalt's conical wake analysis introduced a satisfactory physical model for the jet mixing region which occurs as a result of flow separation.

17. Navigation, Communications, Detection, and Countermeasures

AD-618 029 Div. 19/3, 6/6, 30/2
CFSTI Prices: HC$5.00 MF$1.00

Burroughs Corp., Paoli, Pa.
RADAR VIDEO DATA PROCESSOR.
Final rept.,
by P. Pasquine. Dec 64, 172p
Contract FA WA4693, Proj. 231 001 01C
SRDS RD-64-128
Unclassified report

Descriptors: (*Air traffic control systems, Data processing systems), (*Data processing systems, Air traffic control systems), (*Target recognition, Air traffic control systems), Display systems, Radar range computers, Radar clutter, Search radar, Radar interference, Radar beacons, Airport radar systems, Special purpose computers, Position finding, Tests.

The report covers the design, fabrication, and acceptance testing of four solid-state Radar Video Data Processors (RVDP) intended for use as engineering models in the NAS Air Traffic Control Program. The RVDP accepts search radar video (Normal and MTI), antenna synchro voltages, and triggers from Airport Surveillance (ASR) or Air Route Surveillance (ARSR) radars; also accepted are beacon replies from ATCBI equipment. The function of the RVDP is to process these search and beacon inputs and furnish target messages to a Central Computer Complex (CCC). The RVDP detects targets statistically, determines target position to an accuracy of 1/16 NM in range and 0.088 degrees in azimuth, resolves targets which are at the same azimuth but separated in slant range by 1/4 NM (for ARSR) or 1/8 NM (for ASR), and resolves targets which are at the same range but separated in azimuth by 1.5 antenna beamwidths. Radar targets are detected by an advanced, double-threshold method which minimizes the quantizing of noise as target hits and reduces the number of false alarms due to clutter. A salient RVDP feature is the automatic clutter eliminator (ACE), which assures a high probability of detecting primary radar targets otherwise obscured by thermal noise or clutter.

AD-618 059 Div. 19/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF THE INERTIA OF CARDAN SUSPENSION DISKS ON THE MOTION ON A GYROSCOPIC INTEGRATION OF LINEAR ACCELERATIONS,
by L. N. Slezkin. 7 Jul 65, 10p
Rept. no. FTD-TT-65-333
TT 65-62643
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie, n4 p145-7 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Moment of inertia, Gyroscopes), (*Accelerometers, Motion), Disks, Mechanics, USSR.

AD-618 090 Div. 5/5
CFSTI Prices: HC$4.00 MF$0.75

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ENGINEERING-TECHNICAL REFERENCE BOOK ON ELECTRICAL COMMUNICATION (CHAPTERS 5, 11, AND APPENDIX 2),
by V. V. Novikov, G. F. Zubovskii, V. S. Kogan, and N. I. Voronin. 29 Apr 65, 109p
Rept. no. FTD-MT-64-182
TT 65-62647
Unclassified report

Edited machine trans. of mono. Inzhenero-Tekhnicheskii Spravochnik po Elektrosvyazi, Telegrafiya, n. p. 1963, p292-327, 471-526, 632.

Descriptors: (*Telegraph systems, Automation), (*Telegraph equipment, Installation), USSR, Automation, Operation.

CONTENTS: Automation of telegraph communications;
Systems of automation of telegraph communications;
Semiautomatic system,
Telegraph exchange with coded commutation of telegrams ('Liman'),
System of direct couplings,
Central telegraph station (TsTS);
Bases of design of (TsTS),
Distributing frame,
Line-instrument room of vora-frequency telegraph (LAZ TT),
Instrument rooms,
Automatic switching telegraph station of direct couplings (APS),
Stations of subscriber telegraph,
Phototelegraph,
Mechanization of transport of telegrams, and
Data of Soviet start-stop apparatus ST-35, RTA-50 and their modifications.

AD-618 099 Div. 5/1
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Syracuse, N. Y. Electronics Lab.
MATRIX CONTROLLED DISPLAY DEVICE, PHASE II.
Interim engineering rept. no. 2, 5 Apr-5 Jul 65.
26 Jul 65, 39p
Contract NObsr89334, Proj. SR080301, Task 9475
Unclassified report

Rept. prepared in cooperation with General Electric Co., Military Communications Dept., Oklahoma City, Okla.

Descriptors: (*Display systems, Optical equipment), (*Information retrieval, Display systems), Recording systems, Viewing screens, Thermoplastics, Prisms-(Optics), Optical coatings, Indium compounds, Oxides, Electrodes, Copper, Plating, Feasibility studies.

The progress in a program to develop a feasibility model of a bright, large screen matrix type display using in-air thermoplastic recording and TIRP (Total Internal Reflection Prism) projection techniques is reported. Changes made in the Phase I equipment to incorporate the TIRP prism and matrix substrates being used in Phase II are described. Fabrication of the 25 line matrix was completed on 47 glass substrates and is discussed in detail. Fabrication was by etching a transparent, conductive film of indium oxide on which a photo resist image of the matrix pattern had been formed. The matrix consists of 25 electrodes, each 0.8 mils wide, at a density of 500 per inch. Low resistance contacts to the electrodes were formed by evaporation mask techniques. The majority of substrates had no shorts and from zero to nine opens, the result of being over-etched. Considerations leading to the selection of a photographic mask and the glass substrates for the full scale 2000 line matrix are given.

The mask contains a minimum 4 x 5 inch pattern of lines at 500 pairs per inch. The substrates are 4 x 5 x 0.250 inch Kodak micro flat glass whose front surface flatness is one wavelength per linear inch or better. (Author)

AD-618 129 Div. 6/6, 18/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Naval Missile Center, Point Magu, Calif.
EVALUATION OF THE a-BETA TRACKER FOR USE WITH THE AIRBORNE TACTICAL DATA SYSTEM.
Technical memo.,
by D. A. Dawson. 15 Jul 65, 53p
Rept. no. NMC-TM-65-39
Task RA1200015

Unclassified report

Descriptors: (*Aircraft intercept control systems, Airborne), (*Radar tracking, Digital computers), (*Digital computers, Radar tracking), Combat information centers, Aircraft interception, Search radar, Early warning systems, Radar equipment, Automatic, Tracking, Performance(Engineering).

The report outlines a study whose purpose was to improve the performance of the Airborne Tactical Data System tracker, a part of the E-2A aircraft. This aircraft is designed to provide airborne early warning and automated control of intercepts. Two types of smoothing were considered for the tracker: (1) the existing smoothing system, and (2) a proposed alpha-beta smoothing system. Differences in performance of the two systems are small, but the alpha-beta tracker requires less storage space in the computer and offers greater flexibility than does the smoothing scheme which is presently mechanized. As a result of the study, a new alpha-beta tracker was developed which can perform significantly better than the existing tracker, provided the operator is capable of a higher degree of involvement in tracking maneuvering targets. (Author)

AD-618 198 Div. 19/3
CFSTI Prices: HC$3.00 MF$0.75

Radio Corp. of America, Burlington, Mass.
Aerospace Systems Div.
TARGET DETECTION AND RECOGNITION STUDY.
Final rept. for 22 Nov 61-22 Aug 62,
Sep 62, 58p Rept. no. CR-588-90
Contract N123 62738 29282A X

Unclassified report

Descriptors: (*Target recognition, Television display systems), (*Detection, Targets), Navigation, Terrain, Human engineering, Analysis of variance.

The objective of the present research was to determine the amount of image degradation that can be tolerated by an operator during his use of a television monitor to make navigational corrections. The images employed were presented for durations not exceeding 5.5 seconds. Therefore, although the display was not continuously changing, the decision time available to the operator was realistically brief. It is the judgment of the authors that the task of the subject in the laboratory situation was quite closely related to that to be expected in the field situation, although simplified to permit systematic evaluation. The data have provided unambiguous indications of the effects of varying such factors as line coverage, random noise and terrain complexity. Terrain sector localization can be performed well even when there is appreciable random noise if the imaging system is capable of 250-line coverage or better. Below that value, performance of the task rapidly worsens, even under the most favorable condition of signal-to-noise ratio. Although the subjects differed in their ability to perform the task, as evidenced by a significant difference in variance among subjects, their performance was equivalent with respect to the effects of the major variables. It is therefore predicted that the findings should generalize to the performance of any subject of normal perceptual ability.

AD-618 275 Div. 6/7

Air Force Technical Applications Center, Washington, D. C.
SEISMIC DETECTION METHODS FOR UNDERGROUND EXPLOSIONS,
by Carl Romney. 1963, 15p

Unclassified report

Pub. in Institute of Electrical and Electronics Engineers Transactions and Nuclear Science vNS10 p297-304 Jan 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Underground explosions, Detection), Seismic waves, Seismographs, Identification systems, Velocity, Propagation, Monitors.

Underground explosions are detectable at long ranges only by recording and analyzing seismic waves. The signals received are highly distorted as a result of multipath propagation dispersion, mode conversion, and scattering. The result is that signals from explosions tend to be similar to those recorded from thousands of small earthquakes which occur each year. The basic detection problem thus becomes one of sorting out suspicious events from the many natural events recorded. No way of identifying explosions by seismic means is now known, but methods of identifying a fair proportion of natural events exist and are being improved. The remaining occurrences in the suspicious category could be identified only if other kinds of information were available. (Author)

AD-618 322 Div. 5/1, 28/3, 8/7
CFSTI Prices: HC$1.00 MF$0.50

Army Personnel Research Office, Office of the Chief, Research and Development, Washington, D. C.
INFORMATION EXTRACTION FROM VOICE COMMUNICATIONS: WORK METHODS FOR SINGLE TRANSCRIBERS.
Technical research note,
by Eugene P. Stichman and George E. Renaud.
Jun 65, 23p Rept. no. TRN-154
Proj. 2J024701A723

Unclassified report

Descriptors: (*Voice communication systems, Performance tests), (*Combat information centers, Systems engineering), Signal-to-noise ratio, Army personnel, Auditory perception, Performance(Human), Vocabulary, Radio communication systems, Telephone communication systems, Intelligibility.

Studies are conducted by the Combat Communications Task in voice-radio communications techniques and overall performance of personnel involved in communications operations. An experiment was designed to determine the effects of 20 different transcription methods on the performance of 12 Army enlisted men in transcribing word lists received at 4 signal-to-noise levels. Three aspects of communications procedure were examined: listening to the message, writing the message as it was heard, and using a previous transcript of the message as an aid in re-listening and re-transcribing. Significant improvement in performance was obtained when subjects both listened to and wrote the word lists more than once. Performance did not improve at any signal-to-noise ratio when listening to a given word list more than once before writing the transcript nor when the subjects used

a first or second transcript as a reference aid in retransribing a word list. Conclusion was that although the actual obsolute gain in accuracy was low, there was sufficient improvement to warrant repeated listening and repeated writing of messages when reception conditions are below the marginal level of channel communications. (Author)

AD-618 329 Div. 5/2, 8/7
CFSTI Prices: HC$3.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
A MATHEMATICAL MODEL FOR THE BAPSK SYSTEM.
Technical rept.,
by N. T. Gaarder. Mar 65, 59p Rept. no. TR-2, pt.1
Contract DA36 039SC90859, Proj. 4172
Unclassified report

Descriptors: (*Mathematical models, Adaptive communication systems), (*Radio communication systems, Mathematical models), Phase shifters, Phase modulation, Binary arithmetic, Integral transforms.

The primary objective of this report is the development of a mathematical model for the BAPSK (binary, adaptive, phase-shift-keyed) system exclusive of the propagation medium. Several possible modifications are then included in the model. The report discusses the principles of operation of the BAPSK system and of the various modifications and contrasts these principles with those of several other communication systems. In conjunction with the results of propagation medium and error rate analyses, these comparisons form a basis for a critical evaluation of the system and the modifications.

AD-618 394 Div. 19/3, 8/1, 33/1
CFSTI Prices: HC$3.00 MF$0.75

National Aviation Facilities Experimentation Center, Atlantic City, N. J. Experimentation Div.
AIR TRAFFIC CONTROL RADAR BEACON SYSTEM 3-PULSE SIDE LOBE SUPPRESSION EXPERIMENTATION.
Final rept.,
by George F. Spingler. Mar 64, 82p
Proj. 108 3X
FAA RD-64-36; N64 32467
Unclassified report

Descriptors: (*Air traffic control systems, Radar beacons), (*Radar beacons, Antenna radiation patterns), Omnidirectional antennas, Diodes(Semiconductor), Microwave equipment, Antenna lobes, Side-looking antennas, Radar pulses, Radar antennas, Electronic switches, Compatibility, Tests.

The report contains the results of technical and operational tests of Air Traffic Control Radar Beacon System 3-Pulse Side Lobe Suppression Development equipment to determine their suitability for implementation of the 3-Pulse Side Lobe Suppression technique. The Side Lobe Suppression Omni-directional Antenna met the side lobe coverage and netting with the Directional Antenna requirements. The colocation siting problems of the Omni-directional and the Directional Antennas were also investigated and found to be minor in nature. A number of difficulties requiring modification of the ATCBI-2 Transmitter System were uncovered during the experimental testing of the 3-Pulse Modification Kit, but the 3-Pulse Modification Kit did effectively perform the basic requirement of generating the correct number of mode and side lobe suppression pulses. The original Side Lobe Suppression Crystal Diode Switch failed to meet the insertion loss specification, but with the modification of the switch crystals, all specifications were met. The various modifications to incorporate the 3-Pulse Side Lobe Suppression technique were feasible and compatible; and, it was recommended that the modifications be implemented in the Air Traffic Control Radar Beacon System. (Author)

AD-618 398 Div. 5/2, 8/1, 12/2
CFSTI Prices: HC$2.00 MF$0.50

Sylvania Electronic Systems, Waltham, Mass. Applied Research Lab.
WAVEGUIDE ADMITTANCE FOR RADIATION INTO PLASMA LAYERS-THEORY AND EXPERIMENT.
Scientific rept.,
by Janis Galejs and Michael H. Mentzoni. Apr 65, 26p Rept. nos. SR-8, RR-451
Contract AF19 628 2410, Proj. 4642, Task 464202
AFCRL 65-373
Unclassified report

Descriptors: (*Plasma sheath, Radio transmission), (*Atmospheric entry, Radio transmission), (*Waveguides, Admittance), (*Radio transmission, Plasma sheath), Slot antennas, X band, Dielectrics, Styrene plastics, Orifices, Electrical impedance, Glow discharges, Halocarbon plastics, Probes(Electromagnetic), Diffusion, Density, Mathematical models, Reentry vehicles, Guided missile antennas.

Measured admittance of an X-band waveguide radiating into dielectric and plasma layers is compared with variationally computed admittance figures. The waveguide admittance measurements for polystyrene sheets of varying thicknesses compared closely with calculations. The admittance measurements for plasma layers are made during the diffusion controlled afterglow of a pulsed discharge contained in a bell-shaped vessel. The plasma density was measured over approximately 70 percent of the thickness of the plasma layers and was found to be nearly constant in this range which excluded regions near the boundary. Numerical solutions of the equations for ambipolar diffusion during the afterglow in a rectangular geometry show that the lateral plasma density variations are negligible in the vicinity of the waveguide. The measured admittance and plasma density data are shown to agree with calculations made for homogeneous plasma layers, if a correction is made for elevated ion temperatures for times of approximately 10 to 20 microsec. following the discharge. Several computational models consider plasma stratifications near the boundary of the plasma layer but they do not improve the agreement between measurement and calculations.

AD-618 415 Div. 19/3
CFSTI Prices: HC$1.00 MF$0.50

National Aviation Facilities Experimental Center, Atlantic City, N. J. Experimentation Div.
FEASIBILITY STUDY OF AIRBORNE TACAN INTERROGATOR MODIFICATIONS TO REDUCE FALSE SECTOR LOCK-ON.
Final rept.,
by Bernard Weinstein, John Walls, Carl Trout, and Henry Hurley. Jul 65, 15p
Proj. 330 006 03N
FAA RD-65-82
Unclassified report

Descriptors: (*Air traffic control systems, Radio navigation), (*Radio navigation, Direction finding), (*Direction finding, Radio navigation), Aircraft equipment, Aviation safety, Direction finding stations, Design, Feasibility studies, Airborne.

A feasibility study of airborne TACAN interrogator modifications to reduce false sector lock-ons has been conducted. Two different types of circuit modifications

were investigated: In one type, called Modification No. 1, the 15-cps gate-width was limited to a maximum of ± 10 degrees. This allowed the 15-cps error to be as much as ±10 degrees without causing any error to be indicated on the Course Deviation Indicator (CDI). In Modification No. 2, the 15-cps gate-width was limited to a mixmum of ±20 degrees. This allowed the 15-cps error to be as much as ±20 degrees without causing the servo motor to go into the search condition.

AD-618 422 Div. 5/2
CFSTI Prices: HC$2.00 MF$0.50

Systems Research and Development Service, Federal Aviation Agency, Washington, D. C.
FAA HIGH GAIN AIR/GROUND/AIR VHF/UHF TROPOSCATTER SYSTEM.
Interim rept.,
by Oscar T. Grann. Apr 65, 48p
Rept. no. RD-65-40
Proj. 221 120 01C
Unclassified report

Descriptors: (*Radio communication systems, Air traffic control systems), (*Radio transmission, Troposphere), Propagation, Gain, Very high frequency, Ultrahigh frequency, Airborne, Scattering, Refractive index, Attenuation, Radio equipment, Dipole antennas, Antenna radiation patterns, Reliability(Electronics).

This report contains a brief history of experimentation and development effort conducted by the FAA and others in air/ground/air troposcatter communications systems and information as to the Systems Research and Development Service future program plans in this area. This report also contains a description of the FAA high gain system hardware with siting information necessary for proper operation. A method for approximating the reliable communications ranges to be achieved from these facilities is also included. (Author)

AD-618 500 Div. 6/1
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
SOME ASPECTS OF THE DETECTABILITY OF BROADBAND SONAR SIGNALS BY NONDIRECTIONAL PASSIVE HYDROPHONES,
by F. B. Tuteur. Jun 65, 70p
Memo. no. RM-4578-ARPA
Contract SD79, ARPA Order 189 61
Unclassified report

Descriptors: (*Sonar signals, Detection), (*Hydrophones, Sonar signals), Broadband, Submarines, Submarine noise, Probability, Acoustic detectors, Optimization.

This Memorandum deals with some of the problems arising in the passive detection of submarines by single, nondirectional hydrophones. The signal emitted by the submarine is assumed to be a broadband noise whose characteristics are similar to those of the background noise. Hence, detection is possible primarily because of the increase in noise power caused by the presence of a target. The effects of the motion of the submarine past the hydrophone and of the uncertainty in the background noise level are analyzed. Although the observation time for a slowly moving submarine is greater than that for a fast submarine, it is found that if there is uncertainty about the background noise level, detectability is essentially independent of observation time. Hence, a faster and therefore noisier submarine is more easily detected than a slower and quieter one. The major factor limiting the detection range is the noise uncertainty; but if the background noise is stationary, the fact that the signal produced by the moving target is a nonstationary noise can be used by the detector to estimate the background noise, and therefore to increase the detectability. (Author)

AD-618 521 Div. 19/3, 8/2
CFSTI Prices: HC$3.00 MF$0.75

Syracuse Univ. Research Corp., N. Y. Defense Systems Lab.
ATCBI-2 LINEAR SYSTEM AND ATCBI-3 LOGARITHMIC SYSTEM.
Final rept.,
by James C. Doty. Mar 65, 83p
Contract FAA ARDS533, Proj. 108 3 8D
SRDS RD-65-28
Unclassified report

Descriptors: (*Air traffic control systems, Transponders), (*Radio beacons, Transponders), (*Logarithmic amplifiers, Intermediate frequency amplifiers), Linear systems, Nonlinear systems, Beacons, Azimuth.

Two methods of providing precision azimuth centermarks were built for use in the Federal Aviation Agency Beacon Navigation system. These methods utilize an amplitude monopulse beacon receiver. The receiver antenna pattern is split into sum and difference channels. The sum channnel produces a conventional maximum output with a target on boresight, while the difference channel output nulls when a target is on boresight. By comparing the relative signal strength of the sum and difference channels, the target azimuth can be determined to less than a quarter of a degree. Such an equipment must be capable of operating over an extremely wide range of signal strengths. In the ATCBI-2 linear equipment the sum and difference signals are amplified in linear IF amplifiers. The problem of varying signal strengths is solved by controlling the gain of the IF amplifiers with a sensitivity time control (STC). The second method described is the ATCBI-3 logarithmic equipment. This approach to the problem of varying signal strengths was developed later and seems more satisfactory than the STC approach. (Author)

AD-618 602 Div. 6/1, 8/2, 4/4

Defense Research Lab., Univ. of Texas, Austin.
THEORETICAL ANALYSIS OF THE SOLION POLARIZED CATHODE ACOUSTIC LINEAR TRANSDUCER.
Interim rept.,
by C. W. Larkam. 12 Nov 64, 16p
Acoustical rept. no. 247
Contract Nonr357902, Proj. NR187 800
Unclassified report

Pub. in Journal of the Acoustical Society of America v37 n4 p664-78 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Transducers, Acoustic detectors), (*Acoustic detectors, Transducers), (*Ions, Solutions), Acoustic equipment, Electrochemistry, Cathodes-(Electrolytic cell), Polarization, Theory, Analysis.

Solions are electrical components involving charge transport by solution ions as contrasted to electrons, holes, or gas ions. Four general types of solion acoustic transducers may be distinguished on the basis of mechanism underlying the transducer action. One of these, the polarized cathode type, offers a combination of advantages, which includes low threshold pressure, high power gain, stable zero, and direct-current transmission. Individually constructed models with a nominally linear pressure response have been used successfully in the study of infrasonic disturbances transmitted through the earth and atmosphere as well as under water. Yet, design and construction methods have not previously been perfected

to a degree that would ensure wide usage. The relatively sluggish motion of the charge carriers in the electrolyte of the transducer is at the same time a necessary condition for transducer action and a factor limiting the dynamic response. A theoretical analysis is presented to explain the observed behavior of the existing devices of this type and to indicate what may be expected from transducers having the benefit of more-refined fabrication techniques. (Author)

AD-618 607 Div. 19/3

Woods Hole Oceanographic Institution, Mass.
NAVIGATION TECHNIQUES USED IN THE THRESHER SEARCH,
by S. T. Knott. 1964, 8p
Contract Nonr402900
Unclassified report

Pub. in Navigation: Journal of the Institute of Navigation v12 n1 p3-10 1965 (Copies not available to DDC or Clearinghouse customers). Presented during the Institute's Annual Meeting June 15, 1964, in the Barbizon Plaza Hotel, New York.

Descriptors: (*Sea rescues, Navigation), (*Navigation, Sea rescues), Loran, Radar navigation, Echo ranging, Underwater sound equipment, Buoys, Navigational aids.

Throughout the search for THRESHER many techniques used in geophysical research were applied routinely to operational search. The most notable examples were the use of taut-line moored reference buoys, the acoustical positioning of deeply towed equipment, deep-sea mosaic photography, and high-resolution echo sounding. It was clear that the potential of both the electronic navigational aids and the acoustic positioning system could be more fully realized by automatic data-taking and plotting. (Author)

AD-618 639 Div. 6/5, 24/2, 19/1, 12/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
VISUAL-PHOTOGRAPHIC METHOD OF OBSERVING WEAK SATELLITES AND COSMIC ROCKETS,
by B. A. Firago. 24 May 65, 22p Rept. no. FTD-64-519
TT 65-62703
Unclassified report

Unedited rough draft trans. of Glavnaya Astronomicheskaya Observatoriya, Pulkovo. Izvestiya (USSR) v23 n1 p169-78 1962.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Satellites(Artificial), Optical tracking), (*Optical tracking, Satellites(Artificial)), (*Photographic techniques, Guided missile tracking systems), Celestial mechanics, Position finding, Celestial navigation, Photographic equipment, USSR.

AD-618 678 Div. 19/2, 1/4, 33/1
CFSTI Prices: HC$3.00 MF$0.75

National Aviation Facilities Experimental Center, Atlantic City, N. J.
ANALYSIS OF RUNWAY MARKING CONFIGURATIONS FOR BRIGHT DAYLIGHT CONTACT FOG OPERATIONS. Interim rept.,
by Robert K. McKelvey and Guy S. Brown. Nov 64, 80p
Proj. 430 008 01R
FAA RD-64-154 Unclassified report

Descriptors: (*Landing aids, Visual perception), (*All-weather aviation, Landing aids), (*Fog, Landing aids), (*Runways, Landing aids), Terminal flight facilities, Visibility, Landing mats, Instrument landings, Approach, Landings, Navigational aids, Flight simulators.

Four experiments were conducted to determine the feasibility of utilizing runway marking to provide guidance for visual transition for landing and for monitoring of runway distance to go. The experiments were done in a visual landing simulator modified to present the field and brightness contrast relationships characteristic of a bright daylight contact fog with a visual range of approximately 1,200 feet. The results suggest that it is feasible to provide visual support under the specified visibility conditions with patterns compatible with the standard narrow gauge touchdown lighting configuration. In addition, it appears possible that these systems can be designed without marking elements in the critical centerline wear area of the landing zone and in 'double ended' versions providing distance to go information. Future work will attempt to extend the distance indicating code to a configuration adequate for 12,000 feet, as well as for the 7,000-foot runway used in these experiments. (Author)

AD-618 679 Div. 19/3, 8/2
CFSTI Prices: HC$3.00 MF$0.75

National Aviation Facilities Experimental Center, Atlantic City, N. J.
EVALUATION OF ATCBI DECODER MODIFICATIONS. Final rept.,
by Robert A. Waldmann. May 65, 57p
Proj. 242 005 02V
FAA RD-65-59
Unclassified report

Descriptors: (*Radar beacons, Air traffic control systems), (*Air traffic control systems, Radar beacons), Ground support equipment, Radar equipment, Transponders, Decoding, Specifications, Navigational aids.

A set of prototype modifications to the decoders of Air Traffic Control Radar Beacon Ground Station, Types ATCBI-2 and ATCBI-3, were evaluated to ensure validity of the design of the modifications as a basis for a product specification. The modifications were designed primarily to detect and process emergency (code 7700) replies, communication-failure (code 7600) replies, and four-train (military) emergency replies. Performance of the modified decoders was observed in order to support estimates of the ability to decode properly a valid emergency reply, communication-failure reply, or four-train emergency reply, occurring in a live operational environment. False alarm rates were investigated under various operating conditions. It was concluded that the basic design of the modifications was valid and, with certain improvements could serve as the basis for a product specification. It was recommended that the basic design be adopted as the basis for the product specification and the modifications be implemented by means of field modification kits. It was also recommended that final acceptance and implementation in the field be contingent upon a practical demonstration that the alignment procedures, supplied with the production modifications, are satisfactory.

AD-618 684 Div. 19/5
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF OPTIMIZATION TECHNIQUES

APPLICABLE TO A NON-LINEAR, VELOCITY-DAMPED INERTIAL NAVIGATOR.
Masters' thesis,
by John Louis Kalish and Charles Franklin Swift, Jr.
Jun 65, 130p Rept. no. GGC/EE/65-8
Unclassified report

Descriptors: (*Optimization, Inertial navigation), (*Inertial navigation, Instrumentation), Damping, Nonlinear systems, Adaptive control systems, Computers.

Two adaptive control techniques are used to damp a second-order velocity-damped inertial navigator. The first technique uses the square of the velocity error to vary the damping and the second technique uses the cross-coupling effects of the earth-level platform. An analog simulation is made to test the feasibility of the approaches taken and to find representative non-linearities and damping parameters in the adaptive loops. The system is then 'flown' on the IBM 7094 computer. An actual undamped inertial navigation system sensor package, using strapped down sensors, had been previously flight-tested and the sensor outputs were stored on magnetic tape. The IBM 7094 computer is programmed to accept this sensor information along with the adaptive loop damping information which allows the system to be tested under realistic flight conditions. Direct comparisons between the systems can then be made. A comparison of the undamped, adaptive damped, and constant damped position error curves shows that the adaptive damping improves the position uncertainty by approximately 70 percent over the undamped system and by approximately 35 percent over the best constant damped system. (Author)

18. Nuclear Science and Technology

AD-617 918 Div. 20/3, 8/2
CFSTI Prices: HC$5.00 MF$1.25

Lockheed Missiles and Space Co., Sunnyvale, Calif.
TABLES OF CAPACITOR DISCHARGE IN TRANSIENT GAMMA RADIATION ENVIRONMENTS,
by DeWitt Landis. 1 Mar 65, 185p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Capacitors, Radiation damage), (*Radiation damage, Capacitors), Electric discharges, Tables, Gamma rays, Programming(Computers), Ceramic capacitors, Tantalum capacitors, Mica capacitors, Paper capacitors, Simulation.

The tables in this report give the response of various types of capacitors to various transient gamma radiation environments. The tables were generated on the Burroughs B5500 digital computer at Stanford University. The parameters used to characterize the capacitors were obtained from the TREE Handbook (Battelle Memorial Institute, DASA 1420, Feb., 1964) and 'Analytical Methods for Predicting Transient Nuclear Radiation Effects on Electronics Circuits and Devices,' (Boeing Corp., RTD TDR-63-3007, July 1963). The capacitor parameters in these reports represent only the average response of many similar capacitors to many different radiation environments. Unit-to-unit and manufacturer-to-manufacturer variations in the capacitors make it impossible to predict the effects of radiation exactly, so these tables should be considered as giving only a 'typical' response of the particular capacitor to the given radiation environment. Assuming, however, that the capacitor parameters from the above reports are exact, then it is believed that the numbers given in the tables, with a few exceptions discussed later, are accurate to three significant figures. Additional tables are given at the end of this report. These tables give the voltage left across a capacitor at various times after t=0 for a fixed resistance shorted across the capacitor at time t=0. The purpose of these tables is to help the design engineer simulate the effects of radiation.

AD-617 971 Div. 20/6, 25/3

Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
ACCURACY OF PAPPROXIMATE SOLUTIONS FOR CURRENTS IN A PLANE PARALLEL ION CHAMBER,
by W. Armstrong and P. A. Tate. 1 Jul 64, 14p
Rept. no. DCBRL-447
Unclassified report

Pub. in Physics in Medicine and Biology v10 n2 p229-41 Apr 1965 (Copies available only to DDC users).

Descriptors: (*Ionization chambers, Electric currents), (*Electric currents, Differential equations), Electric fields, Voltage, Ions, Space charges, Recombination reactions.

A computer solution was obtained for Thomsons' equations for the electric field in a uniformly irradiated ion chamber. Results for the current-voltage relationship agree closely with those calculated by the approximate methods of Mie. In particular, Mie's formula for the nearly saturated region is confirmed for degrees of saturation of 70% and above. The formula derived by Boag and Wilson for this region is shown to hold only for degrees of saturation above 95%. This confirms experimental results previously obtained with practical chambers. (Author)

AD-618 073 Div. 20/3, 8/2
CFSTI Prices: HC$4.00 MF$0.75

General Atomic Div., General Dynamics Corp., San Diego, Calif.
RADIATION EFFECTS ON PRESSURE TRANSDUCER COMPONENTS.
Final technical rept. for 1 Dec 64-28 Feb 65,
by R. A. Poll, L. D. Cotter, D. F. Jackson, and V. A. J. van Lint. Jun 65, 102p Rept. no. GA-6266
Contract AF29 601 6692, Projs. DASA 5710, G3R
WL TR-65-49
Unclassified report

Descriptors: (*Radiation damage, Transducers), (*Transducers, Pressure), Piezoelectric transducers, Strain gages, Coaxial cables, Quartz, Diodes, Transients, Secondary emission.

The performance of two types of pressure transducers and several cables in a radiation environment was evaluated. The transducers were a quartz piezoelectric crystal assembly, and several strain-gauge transducers. The most important perturbations of these transducers by a short pulse of radiation are the emission and absorption of secondary electrons by parts of the device and the conductivity of insulating materials, including quartz, cable connectors, and cables. The experimentally measured results can be applied to evaluate the spurious signals and the perturbation of pressure-induced signals in a specified pulse radiation environment. The gamma levels required for complete turn-on and the neutron levels which would cause failure of silicon controlled rectifiers and Shockley diodes were determined. The zener diodes were investigated to determine the transient effects due to gamma radiation and the permanent zener voltage changes due to neutron radiation. The mechanisms of these perturbations are presented to facilitate the designing of systems to minimize these same perturbations. (Author)

AD-618 078 Div. 20/3, 8/2, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Hughes Aircraft Co., Newport Beach, Calif. Microelectronics Div.
SEMICONDUCTOR DESIGN EFFECTS ON RADIATION RESISTANCE.
Quarterly rept. no. 1, 15 Dec 64-15 Mar 65,
by Richard J. Belardi and Vincent R. Honnold.
15 Mar 65, 53p
Contract DA28 043AMC00418E, Proj. 5900 21 830 23 01
Unclassified report

Descriptors: (*Radiation damage, Semiconductor devices), (*Semiconductor devices, Surface properties), (*Surface properties, Semiconductor devices), Transients, Transistors, Design, Bremsstrahlung, Solid state physics.

All the standard 2N708 transistors and all of the special transistors, except the PNP transistors, were fabricated. These special devices, incorporating a total of fourteen surface variations, were organized under the following general categories: surface damage, epitaxial layers, thermal oxide layers, pyrolytic oxide layers, and surface potential changes. The test circuit used with the Hughes Linac for measuring the radiation response was designed to limit to a minimum the interference from electromagnetic noise and the circuit time constant and still provide sufficient signal strength.

Irradiation data included in this report were obtained on a total of six surface variations with the experimental error (as indicated by root-mean square deviations) less than 3%. Although specific conclusions concerning the numerous surface variations cannot be made until all the special devices have been irradiated and the data statistically analyzed, initial data tends to indicate that surfaces which are more satisfactory from a device manufacturing veiwpoint are also more satisfactory from a transient radiation environment. (Author)

AD-618 079 Div. 20/3, 8/2, 25/6
CFSTI Prices: HC$5.00 MF$1.00

Ventura Div., Northrop Corp., Van Nuys, Calif.
STUDY FOR GENERALIZED MODEL FOR SEMICONDUCTOR RADIATION RESPONSE PREDICTION.
Quarterly progress rept. no. 1, 15 Dec 64-15 Mar 65, by James P. Raymond and William W. Chang. Jun 65, 146p Rept. no. NVR-3840
Contract DA28 043AMC00423E, Proj. 5900 21 830 23 00
ECOM 00423 1

Unclassified report

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Descriptors: (*Radiation damage, Semiconductor devices), (*Semiconductor devices, Radiation damage), Transients, Mathematical models, Transistors, Diodes(Semiconductor), Ionization, Solid state physics.

The lumped-model technique was applied to the characterization of the radiation-induced transient response observed in diodes and transistors. A significant result of the diode analysis was the comparison of the lumped-model response to the solution of the differential equations in describing the diode photocurrent. Application of the lumped-model analysis to the ionizing radiation effects in a grown junction transistor was also straightforward and encouraging. A general expression for the common-emitter transient response was developed in terms of the transistor and common-emitter circuit parameters. This expression allows the calculation of the total transient collector photocurrent as a function of the source resistance, and the quiescent operating current. The experiments necessary to determine the diode and transistor lumped-model parameters were defined. These experiments were completed with the grown-junction transistors specimens, completing the information required for numerical prediction of the transistor response. (Author)

AD-618 130 Div. 20/3, 32/3
CFSTI Prices: HC$1.00 MF$0.50

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST COORDINATE INDEX, PART II.
Rept. for 1 Oct 64-30 Jun 65.
10 Jul 65, 24p

Unclassified report

See also AD-605 619.

Descriptors: (*Radiation damage, Indexes), (*Indexes, Radiation damage), (*Information retrieval, Radiation damage), Reports, Subject indexing, Materials, Abstracting, Radiation effects.

The index is subdivided into four sections. The first, Radiation Environment, includes dosimetry and energy aspects of all electromagnetic and particulate radiation sources, with the exception of space radiation. Section two deals with materials, properties, secondary environment (including space environments), devices, and all other subject concepts. An author section and a generating organization section is added to this quarterly index, as sections three and four. Under each concept term in the index are listed the accession numbers of the abstracts which have been indexed by that term. Links have been added where necessary to obviate improper coordination with the resulting false retrieval. Experience demonstrated that only four of the proposed EJC standard role indicators would have been required with any significant number of the entries.

AD-618 139 Div. 20/3
CFSTI Prices: HC$1.00 MF$0.50

Queen's Univ., Belfast (Northern Ireland). Dept. of Applied Mathematics.
THE STOPPING POWERS OF ATOMS AND MOLECULES, by Y. M. Chan and A. Dalgarno. 1965, 10p
Contract AF61 052 780
AFCRL 65-267

Unclassified report

Descriptors: (*Excitation, Molecules), (*Inelastic scattering, Charged particles), (*Atomic properties, Helium), Atoms, Molecular properties, Particle beams, Absorption, Integration.

A procedure is described for calculating the average excitation energy of an atom or molecule appropriate to the slowing down of a beam of charged particles in a gas. The procedure is applied to helium with the result that its average excitation energy is 42.0 eV. (Author)

AD-618 304 Div. 20/5, 30/4
CFSTI Prices: HC$3.00 MF$0.75

Controls for Radiation, Inc. Cambridge, Mass.
RADIATION FACILITY SUPPORT AND SOLID-STATE STUDIES.
Final rept.,
by James A. Wall, Charles J. Glassbrenner, Sumner Mayburg, and Martin Fritts. 16 Jun 65, 76p
Contract AF19 628 4036, Proj. 5620, Task 562002
AFCRL 65-375

Unclassified report

Descriptors: (*Linear accelerators, Air force research), (*Electron accelerators, Test facilities), Tests, Electron beams, Test methods, Measurement, Linear accelerators, Safety, Health physics, Neutrons, Sources, Thermal conductivity, Determination, Oxygen, Silicon, Ozone, Instrumentation, Solid state physics.

AFCRL linear accelerator acceptance tests are described. A health physics manual was prepared and other safety procedures established for safe operation of the linac facility. Instruments for measuring linac beam current have been developed when necessary. A special ozone detector was developed for rapid measurement of the high levels of ozone developed near the linac. A low temperature thermal conductivity apparatus was designed and assembly has been essentially completed. It has been designed so that thermal conductivity can be measured on samples that have been bombarded at low temperatures. Determination of the concentration of oxygen in silicon to levels as low as 10 to the 13th power atoms/cu cm by means of photonuclear activation analysis is discussed. Initial tests of the technique were performed. The optimum operating electron energy of the AFCRL linac for photoactivation of oxygen is computed to be 19.4 Mev. (Author)

AD-618 376 Div. 20/5
CFSTI Prices: HC$4.00 MF$1.00

Air Force Weapons Lab., Kirtland AFB, N. Mex.
PM-1 ANNUAL SUMMARY REPORT, 1 NOVEMBER 1963-31 OCTOBER 1964.
by James T. Westermeir, John D. Belson, and John L. Singleton. Jul 65, 139p WL-TR-65-91
Proj. 2800, Task 280004
Unclassified report

Descriptors: (*Nuclear power plants, Performance-(Engineering)), Reactor feasibility studies, Electric power production, Power reactors, Reactor cores, Control rods, Water, Chemistry, Reactor poisons, Xeon, Fuel burn up, Reactor system components, Maintenance, Health physics, Safety, Design, Costs, Training.

The report presents an evaluation of PM-1 nuclear power plant operations during the period 1 November 1963 to 31 October 1964. The data utilized in this report were gleaned from the 731st Radar Squadron PM-1 Monthly Summary Reports, work orders, plant logs, supply requests, and Unsatisfactory Reports. All phases of plant operations were evaluated and analyzed. Recommendations are made with the dual objective of cost reduction and improved availability. Weaknesses in several subsystems are discussed. A proposed reorganization of plant personnel is presented, and, based upon this, plant supply procedures are reevaluated. Finally, the high cost of power generation is discussed. Supporting data for all recommendations have been included either in the text or as appendixes. (Author)

AD-618 554 Div. 20/3

Ohio State Univ., Columbus.
THE RADIOACTIVITY OF CADMIUM 105.
Doctoral thesis,
by Richard Then White. 1965, 77p
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Radioactive isotopes, Cadmium), (*Cadmium, Radioactivity), Decay schemes, Gamma rays, Positrons, Nuclear spectroscopy, Palladium.

The most significant results of this investigation are embodied in the proposed decay scheme. Previous research has failed to produce data sufficient for the purpose. The use of enriched target materials made possible production of pure activities. Study of the gamma-ray spectra not only clarified energy transitions with the assignment of eight new gamma rays, but also produced the first determinations of relative transition intensities and of gamm-ray coincidences. Heretofore, no report has been made of the application of modern methods of nuclear spectroscopy to the activity of cadmium 105. The nature of the decay with both intense high-energy gamma rays and positrons presented unusual experimental problems which have been thoroughly described. The completed work provides a sound basis for further study of the neutron-deficient isotopes of cadmium. (Author)

AD-618 688 Div. 20/3, 8/2, 25/6
CFSTI Prices: HC$4.00 MF$1.00

Picatinny Arsenal, Dover, N. J. Nuclear Engineering Directorate.
LABORATORY EXPERIMENTAL ANALYSIS OF GAMMA RADIATION EFFECTS ON SILICON ALLOY JUNCTION SEMICONDUCTOR DIODES.
Technical memo.,
by Burton V. Frank. May 65, 148p
Rept. nos. TM-1633; SMUPA-TK-935
Unclassified report

Descriptors: (*Diodes(Semiconductor), Radiation damage), (*Radiation damage, Diodes(Semiconductor)), Silicon alloys, Gamma rays, Performance(Engineering), Voltage, Ionization, Electric currents.

The behavior of silicon diodes of the alloy-junction type is examined, during the following gamma irradiation, in terms of basic diode theory and radiation induced effects in bulk semiconductor materials. Some twenty-seven IN483B Diodes are exposed to a constant gamma dose rate of 1,000,000 roentgens per hour from a 9,110 curie Cobalt 60 source under constant geometry test conditions. Measurements are made at various gamma dose levels ranging up to 1.67 x 10 to the 8th power roentgens, corresponding to an irradiation exposure time of 167 hours. As was expected, the change in the reverse diode characteristics is significant, whereas there is negligible change observed in the forward diode characteristics. Correlation between the semiquantitative predictions from diode theory and actual experimental data indicate that the transient effects of gamma radiation on silicon diodes are relatively predictable. The procedure developed by the author for predicting the ionization current is summarized. Diode post-irradiation recovery measurements, under reverse bias conditions, show that the diode is directly affected by the exposed gamma dose. (Author)

19. Ordnance

AD-618 084 Div. 22/8, 22/11, 22/7, 1/9
CFSTI Prices: HC$1.00 MF$0.50

Professional Design Co., Agawam, Mass.
DEVELOPMENT, DESIGN, ENGINEERING AND DETAILING WORK ON LAUNCHERS, MACHINE GUNS, FIXED WING ARMAMENTS AND HELICOPTER SYSTEMS.
Final rept.
1965, 24p
Contract DA19 020AMC00359w

Unclassified report

Descriptors: (*Weapons, Design), Automatic weapons, Small arms, Feed mechanisms, Supports, Aircraft equipment, Armament, Rocket launchers, External stores, Helicopters systems, Weapons systems.

AD-618 131 Div. 22/1, 30/3
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
A BIBLIOGRAPHY OF THE ELECTRICALLY EXPLODED CONDUCTOR PHENOMENON. SUPPLEMENT NO. 1.
Special rept.,
by William G. Chace and Eleanor M. Watson. Jun 65, 43p Rept. nos. SR-25, AFCRL-65-384
Proj. 8608, Task 860804

Unclassified report

Descriptors: (*Exploding wires, Bibliographies), (*Bibliographies, Exploding wires), Foils, Explosive materials, Light, Mathematics, Measurement, Photography, Shock waves, Sparks, Spectroscopy, Electric switches, Temperature, Theory, X rays, Films, Plasma physics.

AD-618 135 Div. 22/8
CFSTI Prices: HC$3.00 MF$0.75

Watertown Arsenal Labs., Mass.
PROGRESSIVE STRESS DAMAGE AND STRENGTH OF CENTRIFUGALLY CAST, COLDWORKED GUN TUBES.
by Donald H. Newhall and Peter R. Kosting.
17 Jun 49, 80p Rept. no. WAL-731/281
Proj. TR3 3003C

Unclassified report

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Descriptors: (*Gun barrels, Fatigue(Mechanics)), (*Fatigue(Mechanics), Gun barrels), Centrifugally casting, Cold working, Stresses, Life expectancy, Deformation, Degradation, Experimental data, Mechanical properties, Fracture(Mechanics), Elasticity, Performance(Engineering).

The report presents the results of the hydraulic fatigue tests of centrifugally cast coldworked 75 and 76mm. gun tubes made of steel. In order to obtain data which the engineer could use in designing for resistance to progressive stress damage, test cylinders with wall ratio ranging from 1.2 to 1.8 were used. In the preparation of the test cylinders considerable metal was removed from the outside surface of the coldworked rifled tube. The yield strength of some of these test cylinders was therefore measured in order to determine the influence of the removal of the coldworked metal upon strength. The slope of the elastic expansion curve of the cylinders was also calculated and compared with the theoretical one based on 30,000,000 psi as being the value for Young's modulus. The resistance to progressive stress damage of the coldworked tubes was compared with that of heat-treated-to-strength centrifugal castings and forgings in order to evaluate the benefit of coldworking.

AD-618 196 Div. 22/11
CFSTI Prices: HC$1.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
SIMPLIFIED ANALOG SIMULATION OF FLUID CONTROL OF A ROCKET,
by J. V. Cuneo. 1 Jun 65, 21p
Rept. no. TM-65-27
Projs. DA1P010501A001, HDL31100

Unclassified report

Descriptors: (*Thrust vector control systems, Simulation), (*Rockets, Control systems), (*Control systems, Simulation), (*Jets, Control systems), Analog systems, Artillery rockets.

The report describes a simplified simulation of the control of a ballistic rocket in a horizontal plane. The purpose of the simulation was to investigate the effect of basic system parameters such as gain and limited corrective thrust on the reduction of dispersion caused by thrust malalignment. The parameters of the rocket model were of the early Littlejohn class, and the rocket was considered not to roll. The control system gain and corrective thrust parameters were based upon estimates of the performance of fluid control devices and methods. (Author)

AD-618 371 Div. 5/2, 8/6
CFSTI Prices: HC$2.00 MF$0.50

Naval Research Lab., Washington, D. C.
RAY TRACING IN RISING AND FALLING DUCTS.
Final rept.,
by N. W. Guinard, M. B. Laing, and K. W. Morin.
22 Jun 65, 29p Rept. no. NRL-6253
Proj. RR008 01 41 5550

Unclassified report

Descriptors: (*Communication theory, Wave transmission), (*Wave transmission, Troposphere), Atmosphere, Radio signals, Radio transmission, Radio communication systems, Mathematical analysis, Programming(Computers), Iterative methods, Propagation, Electromagnetic waves, Refractive index.

In studying signal transmission beyond the horizon by elevated duct propagation, estimates are needed of the losses. These estimates can be made by application of ray tracing for models of longitudinally varying ducts. A program was written in the NELIAC language for producing ray trajectories in an atmosphere which is variable in two dimensions. The program was run in the NAREC digital computer, and the resulting plots of the ray paths are used to analyze certain of the loss mechanisms in elevated ducts. Changes of the acceptance angle, i.e., refractive index gradient at a fixed altitude can cause continued losses. Changes in duct geometry causes losses which are a function of the height slope distribution at the point of change. A third loss mechanism, that of scattering, is not handled in the present analysis, but it is pointed out that a discontinuous duct may approach the Booker and Gordon model for tropospheric scatter. (Author)

AD-618 478 Div. 22/1
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.

TERMINATED EXPLODING WIRE ENERGY SOURCE,
by Louis A. Rosenthal. 29 Apr 65, 25p
Rept. no. NOLTR-65-12
Task RUME4E 000 212 1F008 08 11
Unclassified report

Descriptors: (*Exploding wires, Explosive initiators), (*Explosive initiators, Exploding wires), Capacitors, Circuits.

By placing a discharge or 'dump' tube across an exploding bridgewire load, it is possible to by-pass the electrical energy and terminate the explosion of the wire. The dump tube is triggered by a signal derived from the energy removed from the storage capacitor. (Author)

AD-618 484 Div. 22/1, 18/3
CFSTI Prices: HC$2.00 MF$0.50

Picatinny Arsenal, Dover, N. H. Army Explosive Ordnance Disposal Center.
FEASIBILITY STUDY ON EOD APPLICATIONS FOR LIQUID NITROGEN.
Technical memo.,
by Robert R. Vennell. Jun 65, 40p
Rept. no. TM-1667
Projs. 1W523801A583, 404C
Unclassified report

Descriptors: (*Fuzes(Ordinance), Quenching(Inhibition)), (*Ammunition components, Disposal), (*Nitrogen, Liquefied gases), (*Detonators, Quenching(Inhibition)), Quenching(Cooling), Failure(Mechanics), Effectiveness, Cryogenics, Degradation.

A test program was conducted to develop a new means of inactivation of munition components by means of cooling to cryogenic temperatures. The cooling medium used was liquid nitrogen at a temperature of -320F. Three fuze assemblies: the M562, the M524, the M509 and their elements were tested. While some success was achieved with the mechanical elements of timing fuzes (M562 and M524), where almost 90% were rendered immobilized, liquid nitrogen had little effect on detonator sensitivity, piezo electric crystals, and carbon bridge type electric detonators. (Author)

AD-618 534 Div. 22/1, 12/5
CFSTI Prices: HC$1.00 MF$0.50

Systems Management and Engineering Dept., Fairchild Space and Defense Systems, Syosset, N. Y.
DESIGN AND DEVELOPMENT OF A DISTANCE MEASURING DEVICE.
Monthly progress rept. no. 1, phase 3, 1-30 Apr 65,
by Eugene A. Brown. 30 Apr 65, 23p
Contract DA28 017AMC975A
Unclassified report

Descriptors: (*Distance-measuring equipment, Arming devices), (*Arming devices, Distance-measuring equipment), Fuzes(Ordnance), Switching circuits, Wiring diagrams, Design, Guided missile fuzes, Integrated circuits, Rocket fuzes.

During the period covered by this report, a block diagram for a revised Distance Measuring Device (DMD) was generated, and a study of the requirements of distance measuring fuzes for weapons with ranges up to five (5) kilometers was initiated.

AD-618 675 Div. 22/1
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
INITIATION OF EXPLOSIVES BY EXPLODING WIRES. VII. EFFECT OF ENERGY TERMINATION ON THE INITIATION OF PETN BY EXPLODING WIRES.
Technical rept.,
by Howard S. Leopold. 25 Jun 65, 33p
Rept. no. NOL-TR-65-56
Proj. PA019, Task RUME4E000 212 1F008 08 11
Unclassified report

Descriptors: (*Explosive initiators, Exploding wires), (*Exploding wires, Explosive initiators), (*PETN, Exploding wires), Impact shock, Thermal radiation, Detonation waves, Detonation, Firing circuits, Gold, Platinum, Capacitors, Electric discharges.

Artificial termination of the capacitor discharge pulse to gold and platinum bridgewires shows that the arc phase is largely unnecessary for effecting detonation in PETN. The time of energy termination is dependent upon when the PETN reaction becomes self propagating. Two modes of initiation by exploding wires are suggested by the experiments: Pure shock, and the combination of shock and thermal energy inputs. Energy input after burst is superfluous for the shock initiation mode but necessary when initiation is largely thermal. (Author)

AD-618 687 Div. 22/4
CFSTI Prices: HC$1.00 MF$0.50

Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
AN EXPERIMENTAL STUDY OF HIGH VELOCITY IMPACT AT NORMAL AND OBLIQUE INCIDENCE ON MULTIPLE SPACED 2024-T3 ALUMINUM PLATES, GENERAL MODEL,
by D. P. Hickey. Jun 65, 20p Rept. no. SM-47873
Unclassified report

Descriptors: (*Hypervelocity projectiles, Terminal ballistics), (*Terminal ballistics, Hypervelocity projectiles), (*Aluminum alloys, Penetration), Metal plates, Spheres, Steel, Copper, X-ray photography.

An experimental investigation was made of projectile impact on multiple, spaced 2024-T3 aluminum plates at incident projectile velocities on the order of 13,000 ft./sec. The leading plate was either 1/4 in. or 1/16 in. in thickness, with succeeding plates of 1/8 in. in thickness. The spacing between plates was 1-3/4 in. (measured normal to the front plate from the back of the front plate to the front of the following plate). Projectile impace occurred at normal (0 degrees) and oblique (60 degrees) incidence. The projectiles were solid copper and annealed steel spheres of 3/16 in. nominal diameter. The results obtained showed that no more than two plates were completely penetrated. For normal impact, it was found that the hole diameter could be predicted from existing empirical relations. (Author)

20. Physics

AD-617 923 Div. 25/6, 25/2
CFSTI Prices: HC$4.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
OPTICAL PROPERTIES OF CdSe AND ZnO SINGLE CRYSTALS.
Master's thesis,
by John Sherman DeWitt. May 65, 104p
Rept. no. SP/PH/65-8
Unclassified report

Descriptors: (*Semiconductors, Single crystals), (*Cadmium alloys, Selenium alloys), (*Zinc compounds, Oxides), (*Single crystals, Optical properties), Reflection, Dielectric properties, Electron transitions, Atomic energy levels.

The optical properties of CdSe and ZnO single crystals have been determined from reflectivity measurements in the range of photon energies 2.5 - 14 electron volts. The measurements were made in a one meter vacuum monochromator using a hydrogen emission source. The crystals were grown from the vapor phase and consisted of platelets (CdSe) and bulk prisms (ZnO). The optical constants, n and k, and the real and imaginary parts of the dielectric constant were derived from the reflectivity measurements by a Kramers-Kronig analysis. The observed spectrum of CdSe is in good agreement with previously reported results of Cardona. The observed ZnO spectrum corresponds with similar results reported for other II-VI wurtzite semiconductors. The peaks have been interpreted as direct interband transitions in terms of an analogous zinc-blende energy band structure. (Author)

AD-617 942 Div. 20/1
CFSTI Prices: HC$4.00 MF$1.00

Instituto de Investigacion Aeronautica y Espacial, Buenos Aires (Argentina).
PHENOMENOLOGICAL AND MICROSCOPIC ANALYSIS OF PROPERTIES OF EVEN-EVEN NUCLEI. PART A. PHENOMENOLOGICAL MODELS.
Annual rept. for 1 Feb 64-1 Feb 65,
by C. A. Heras, S. M. Abecasis, and H. E. Bosch.
Mar 65, 131p Rept. no. LR-7
Grant DA AR049 092 64G35, Proj. 2001050B700
Unclassified report

Research done in cooperation with La Plata Univ., Argentina. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Even-even nuclei, Nuclear models), (*Nuclear properties, Even-even nuclei), Excitation, Nuclear energy levels, Parity, Vibration, Rotation, Spheres, Ellipsoids.

The general features of several nuclear models are described. Special attention is given to those nuclear models connected with the low-lying excited states of even-even nuclei. Two special forms of the unified model were considered: The vibrational model in which only surface collective oscillations are considered; and The rotational model in which the nuclear shape is taken as fixed, so that rotations are the only collective motions allowed. The rotational or strong coupling model has proved very successful in the interpretation of properties of nuclei in the mass regions 19<A<25; 150<A<190, and A>226. The excited states of even-even nuclei show certain regularities, allowing to distinguish different 'types' of spectra (Ma4, Sh1) characterized by the energy ratios between the excited levels and the character of these levels.

AD-617 943 Div. 9/1, 9/4
CFSTI Prices: HC$3.00 MF$0.75

Technion - Israel Inst. of Tech., Haifa.
NEAR WAKE FLOW STUDIES IN SUPERSONIC FLOW.
Annual summary rept. no. 3,
by Josef Rom. Mar 65, 64p Rept. no. TAE-38
Contract AF61 052 576
ARL 65-152
Unclassified report

Descriptors: (*Supersonic flow, Wakes), (*Wakes, Supersonic flow), Two-dimensional flow, Axially symmetric flow, Base flow, Laminar flow, Turbulence, Wedges, Flat plate models, Thermodynamics, Test facilities, Instrumentation.

The theoretical and experimental investigations carried out on supersonic flow over two-dimensional and axially symmetric base type separated flows are summarized in this report. Correlating equations for base pressure and backward facing step pressure with laminar and turbulent separation are presented. These relations are obtained from considerations of the analysis based on the integral method and experimental data. Measurements of total pressure and temperature profiles in the near wake of a two-dimensional wedge-flat plate model at M=3.5 indicate high recovery temperatures at the outer regions of the wake beyond the neck position. The development of the shock tunnel and its associated equipment is reported, including an improved method for thin film resistance thermometers calibration. (Author)

AD-617 949 Div. 25/3, 9/2
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EXPERIMENTAL INVESTIGATION OF THE INTERACTION OF A SHOCK WAVE AND AN ELECTRIC ARC.
Master's thesis,
by William Spencer Campbell. Mar 65, 56p
Rept. no. GSP/PH/65-5
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. A copy is available for public sale.

Descriptors: (*Shock waves, Electric arcs), (*Electric arcs, Cooling), Plasma medium, Pressure, Temperature, Gas flow, Shock tubes, Pressure gages, Transducers, Diaphragms(Mechanics).

A shock tube was assembled and instrumented to study a shock propagating along the interelectrode axis of an electric arc. Shock tube calculations were presented and compared with experimental data. Mach numbers were generally predicted within seven per cent. A graphical means of determining diaphragm score depths for given bursting pressures was displayed. An experimental model of the arc as an axi-symmetric, homogeneous plasma was used to relate the results of various investigations in gas dynamics to the shock-arc interaction. Shadowgraph pictures were attempted, but results were negative. Equations for the method of characteristics were developed. (Author)

AD-617 950 Div. 25/4
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INVESTIGATIONS OF A SODIUM-MERCURY METAL VAPOR LASER.
Master's thesis,

by Clinton Tucker Meneely. Mar 65, 61p
Rept. no. SP/PH-65-15
Unclassified report

Descriptors: (*Lasers, Gases), (*Metals, Vapors), (*Vapors, Lasers), Sodium, Mercury, Quantum mechanics, Atomic energy levels, Resonance, Excitation.

While many gaseous lasers have been developed using noble gases, relatively few gaseous lasers have been developed which operate on metallic vapors, perhaps because of the technical difficulties involved. Much of the basic research into metallic energy level systems and their interactions with other systems has been done long ago by the early spectroscopists. Their findings need only to be reappraised in the light of laser theory to be useful. It is shown that the 'technical difficulties' involved in metallic vapor systems can probably be overcome with careful equipment design.

AD-617 957 Div. 25/2, 25/4
CFSTI Prices: HC$2.00 MF$0.50

Linde Div., Union Carbide Corp., Indianapolis, Ind.
CZOCHRALSKI GROWTH OF LaA1O3.
Final technical rept. for Jan-May 65,
by C. D. Brandle, H. Fay, and O. H. Nestor. 9 Jul 65, 26p Rept. no. SRCR-65-4
Contract Nonr479300, Proj. NR017 722; ARPA Order 306
Unclassified report

Descriptors: (*Crystal growth, Lanthnium compounds), (*Lanthnium compounds, Aluminates), (*Lasers, Lathnium compounds), Color centers, Crystal lattice defects, Crystal structure, Crystals, Impurities, Bismuth compounds, Praseodymium compounds, Chromium, Europium, Transformations, Optical properties.

The program explores the possibility of growing high optical quality LaAlO3 by the Czochralski method. The techniques developed for ruby growth were found to be directly translatable to LaAlO3 with no apparent limitations imposed by the use of a crucible. Undoped and doped (Cr(3+), Eu(3+)) crystals of various orientations were grown. Two major defects were encountered: color centers and twinning. Color centers were eliminated by using high purity starting materials in combination with selected growth and post-growth treatment. Two mechanisms for forming color centers are proposed and their relation to LaAlO3 defect chemistry is discussed. The dominant twin planes have been identified to be those of the (100) system. Their relation to the crystal strucutre of LaAlO3 has been elucidated. Isolated attempts were made to grow BiAlO3 and PrAlO3 to determine if twinning might be a problem in these potential host compositions; other growth problems were encountered indicating that an answer could be obtained only by an extensive effort beyond the bounds of the present program. (Author)

AD-617 960 Div. 25/4, 25/5, 25/6
CFSTI Prices: HC$2.00 MF$0.50

Mithras, Inc., Cambridge, Mass.
RESONANT HARMONIC GENERATION AND NON-LINEAR OPTICS.
Scientific rept. for 1 Oct 64-31 Mar 65,
by Charles S. Naiman, Jack Schwartz, Jacques Ducuing, and Jan P. van der Ziel. 31 Mar 65, 29p
Rept. no. MC-63-96SR
Contract AF49 638 1464
AFOSR 65-0727
Unclassified report

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Descriptors: (*Harmonic oscillators, Crystals), (*Quantum mechanics, Harmonic oscillators), (*Optics, Harmonic oscillators), Nonlinear systems, Semiconductors, Quartz, Tourmaline, Zinc compounds, Oxides, Nickel compounds, Sulfates, Hydrates, Lithium compounds, Niobates, Resonance absorption, Tensor analysis.

This report sketches the basic theory of optical second harmonic generation in sufficient generality to include materials with absorption at the fundamental, the second harmonic, or both. It is shown how such absorptions can result in enlarged values of the coefficient of second harmonic generation. The effects of the basic light propagation properties of the material as they contribute to the overall production of second harmonic radiation are further developed. In particular, a discussion is given of the relations between the elements of the second harmonic generation tensor, and the relations between these coefficients appropriate to the crystals of interest in this study. (Author)

AD-617 965 Div. 25/3, 20/2
CFSTI Prices: HC$3.00 MF$0.75

Dikewood Corp., Albuquerque, N. Mex.
EXTRAPOLATING ELECTROMAGNETIC FIELDS FROM VALUES IN A SPHERICAL REGION.
Rept. for Oct 64-Mar 65,
by D. D. Babb and K. D. Granzow. Jun 65, 55p
Contract AF29 601 6634, Proj. 5710, Task 571004
WL TR-64-179
Unclassified report

Descriptors: (*Field theory, Electromagnetic fields), (*Electromagnetic fields, Mathematical prediction), (*Special functions(Mathematical), Electromagnetic fields), Boundary value problems, Integrals, Operators-(Mathematics), Partial differential equations, Electromagnetic pulses, Nuclear explosions, Propagation.

Methods are developed for extrapolating electromagnetic fields from values of the spherical harmonic expansion coefficients of the spherical components on a sphere surrounding a source region. The region outside the sphere is considered to be homogeneous, isotropic, source free, and nonconducting, except that application of the method of images allows the introduction of an infinitely conducting ground plane. Solutions of the scalar wave equation are made applicable by expressing the spherical harmonic expansion coefficients of the rectangular components in terms of the coefficients of the spherical components. Two methods are developed for obtaining time dependent solutions for fields at points outside the sphere without invoking Fourier analysis. One method results from inserting the expansions of the rectangular components into the Kirchhoff integral solution of the wave equation. The other method involves eliminating the explicit frequency dependence of the eigenfunction solution of the wave equation by introducing a differential operator to replace the Hankel function. These methods are useful when the source has a very wide-band frequency spectrum, so that it is best described in the time domain. This is the case with electromagnetic pulses from nuclear detonations. (Author)

AD-617 973 Div. 25/6

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Physics.
SOLID HELIUM,
by J. S. Dugdale. 1964, 10p Rept. no. NRC-8410
Unclassified report

Pub. in Transactions of the Royal Society of Canada v2(Ser 4) p267-76 Jun 1964 (Copies available only to DDC users).

Descriptors: (*Helium, Solidified gases), (*Solidified gases, Helium), Canada, Solids, Isotopes, Density, Specific heat, Phase studies, Atomic energy levels.

Although the zero-point energy dominates the properties of the solid helium isotopes at low densities, more and more experimental evidence is accumulating to show that, except perhaps at a few singular points or limited regions of very low density, the thermodynamic properties of the solids are very similar to those of the other inert gas solids and can probably be explained by quasi-harmonic lattice theory. Nevertheless, because of the large zero-point energy, a fundamental theoretical treatment of solid helium is still lacking. (Author)

AD-617 982 Div. 25/4, 8/6

Office of Research Analyses, Holloman AFB, N. Mex.
DOPPLER SHIFT THROUGH HETEROGENEOUS ANISOTROPIC GASES.
Final rept.,
by Bruno Manz. 1 Sep 64, 11p Rept. no. ORA-65-3
Unclassified report

Pub. in Journal of the Optical Society of America v55 n3 p276-83 Mar 1965
(Copies not available to DDC or Clearinghouse customers).
Revision of manuscript dated Jun 65.

Descriptors: (*Doppler effect, Gases), (*Gases, Doppler effect), Electromagnetic waves, Wave transmission, Frequency shift, Anisotropy, Fluid mechanics, Optics.

While the pure Doppler shift is a simple affair, the frequency shift between an emitter of monochromatic light and a receiver becomes a rather complex event if these move at arbitrary speeds through a transmitting medium which is optically heterogeneous and anisotropic. In that case, such phenomena as aberration of light, light drag by flowing matter, the so-called 'local-index-effect,' and the bending of the light path due to refraction, combine with the pure Doppler shift in affecting the frequency relation. Anisotropy of the medium, as resulting from light drag by flowing matter, is inevitable if there does not exist an inertial frame of reference in which the medium is everywhere at rest. An example is the shock front. The theory of these effects is developed on the basis of the 'principle of the invariance of the phase function under Lorentz transformation' and the 'principle of the constancy of the frequency in stationary media.' Formulas are developed for the frequency shift between emitter and receiver if the signal goes from the emitter via one or more reflectors to the receiver, all moving at arbitrary speeds through a medium which may be heterogeneous, anisotropic, and include flow fields, shock fronts, etc. (Author)

AD-617 984 Div. 8/6

Florida Univ., Gainesville. Dept. of Physics and Astronomy.
AXIAL RATIO OF THE PROJECTED POLARIZATION ELLIPSE,
by S. Ramu. 26 Aug 64, 4p
Unclassified report

Pub. in Australian Journal of Physics v17 n4 p556-8 Dec 8 1964 (Copies available only to DDC users)
Supported by NSF.

Descriptors: (*Radio waves, Polarization), Electromagnetic properties, Dipole antennas, Ellipsoids, Equations.

AD-617 987 Div. 25/6

Polytechnic Inst. of Brooklyn, N. Y.
VISCOELASTIC DAMPING OF VIBRATIONS OF SANDWICH PLATES AND SHELLS,
by Yi-Yuan Yu. 1963, 22p
Grant AF AFOSR60 63
AFOSR 65-0919
Unclassified report

Pub. in Non-Classical Shell Problems. Proceedings of the I.A.S.S. Symposium, Warsaw, September 2-5, 1963 p551-71.(Copies available only to DDC users).

Descriptors: (*Structural shells, Vibration), (*Sandwich panels, Vibration), (*Vibration, Damping), Viscoelasticity, Cylindrical bodies, Shear stresses, Deformation, Partial differential equations, Integral equations.

A new variational principle is presented, which may be considered as a generalized Hamilton's principle. The principle is made use of in the derivation of the complete system of equations for a sandwich cylindrical shell, which are reducible to those of a sandwich plate as a special case. The way the equations are derived is also new. The equations of the sandwich plate and cylindrical shell are used to investigate the undamped vibrations of these structures. Of particular interest are an analysis of the coupling between the flexural and extensional motions of the sandwich cylindrical shell and a demonstration of the importance of transverse shear deformation in the vibrations of the sandwich plate and cylindrical shell. The effectiveness of viscoelastic damping of vibrations in the sandwich plate and cylindrical shell is investigated through the use of the concept of the damping parameter.

AD-617 988 Div. 20/1

Texas Univ., Austin. Dept. of Chemistry.
SOME ASPECTS OF TRANSITIONS BETWEEN ELECTRONIC LEVELS,
by W. Albert Noyes, Jr. and I. Unger. 1964, 14p
Grant AF AFOSR778 65, Proj. 9760, Task 976002
AFOSR 65-0890
Unclassified report

Pub. in Journal of Pure and Applied Chemistry v9 p461-72 1964(Copies available only to DDC users).

Descriptors: (*Electron transitions, Polyatomic molecules), Gases, Internal conversion, Photochemistry, Ketenes, Ketones.

The transitions between electronic levels of polyatomic molecules and their relationship to the photochemistry of such molecules are considered. These transitions often occur without emission or absorption of radiation so that the state first formed by the absorption of radiation may not be the one most concerned with the resulting reaction kinetics. The present discussion reviews the data for a few polyatomic molecules, i.e., ketene, acetone, biacetyl, benzene, and ketones with C atoms to the carbonyl group, to determine both the extent of and the character of intersystem cross-overs and of internal conversions. The terms internal conversion and intersystem cross-over refer to a non-radiative transition between states of the same multiplicity and of different multiplicity, respectively. The scope of the subject is limited to the gas phase. (Author)

AD-617 993 Div. 25/6, 25/2

Spectroscopy Lab., Mass. Inst. of Tech., Cambridge.

DIELECTRIC DISPERSION OF SOME PEROVSKITE ZIRCONATES,
by C. H. Perry, D. J. McCarthy, and G. Rupprecht.
6 Jan 65, 2p
Contract DA36 039AMC03200E; Grant NSF G19637
Unclassified report

Pub. in Physical Review v138 n5A pA1537-8
May 31 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Zirconates, Dielectric properties), (*Dielectric properties, Zirconates), Calcium compounds, Strontium compounds, Barium compounds, Lead compounds, Titanates, Reflection, Spectroscopy, Crystal lattices, Antiferroelectricity.

The dielectric properties of perovskites have been the subject of many investigations, but a direct correlation between the dielectric constant and a normal optcally active lattice mode has been convincingly established only in the case of the paraelectric strontium titanate. The identification of this so-called 'soft' mode is still debated. Such an assignment of the normal-mode spectrum in perovskites is now achieved by a comparison of the normal modes of titanates and zirconates. In addition, evidence is presented that also in the case of an antiferroelectric material, lead zirconate, the low-frequency dielectric constant is the result of a low-frequency optically active mode, at K = O, whose contribution to the dielectric constant accounts for about 90% of its value at room temperature. (Author)

AD-617 997 Div. 25/6, 25/2, 25/3

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
TEMPERATURE DEPENDENCE OF THE ANTIFERROMAGNETIC ANISOTROPY IN MnF2,
by J. C. Burgiel and M. W. P. Strandberg. 1 Sep 64, 6p
Contract DA36 039AMC03200E
Unclassified report

Pub. in Journal of Physics and Chemistry of Solids v26 p877-81 1965(Copies available only to DDC users).

Descriptors: (*Manganese compounds, Fluorides), (*Fluorides, Antiferromagnetism), (*Antiferromagnetism), (*Antiferromagnetism, Anisotropy), Crystal substructure, Resonance, Thermal properties, Cryogenics, Nuclear spins, Field theory.

Existing data on the temperature dependence of the sublattice magnetization and of the antiferromagnetic resonance frequency of MnF2, together with new antiferromagnetic resonance data, are used to determine the temperature dependence of the antiferromagnetic anisotropy energy. The experimental results are discussed in terms of the existing theoretical treatments of this problem, particularly the classical theory of Zener, and the spin-wave theory of Oguchi. Considerations indicate the existence of nearly complete correlation between neighboring spins at all temperatures right up to the Neel temperature. (Author)

AD-617 998 Div. 25/6, 25/2, 25/7

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
EVIDENCE FOR A CONSIDERABLE NONLINEAR DIPOLE ABSORPTION IN GALLIUM ARSENIDE,
by R. Geick. 30 Nov 64, 5p
Contract DA36 039AMC03200E Unclassified report

Pub. in Physical Review v138 n5A pA1495-9
May 31 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Semiconductors, Spectra(Infrared)), (*Gallium alloys, Arsenic alloys), (*Arsenic alloys, Absorption spectrum), (*Infrared spectroscopy, Semiconductors), Dipole moments, Crystal lattices, Nonlinear systems, Germanium, Phonons, Band spectrum, Resonance, Damping.

A comparison is made of the infrared lattice absorption spectra of Ge and GaAs. For this purpose an approximate damping function is derived for GaAs. The comparison of the damping functions shows that both the nonlinear dipole moment and the anharmonicity should be important for the absorption of GaAs in the two-phonon and three-phonon summation bands. The matrix elements for these two mechanisms are found to have nearly the same order of magnitude. In the absorption coefficient and in the imaginary part of the dielectric constant, the anharmonicity in connection with the infrared-active lattice mode dominates at frequencies near the resonance frequency, while the nonlinear dipole moment dominates in the three-phonon summation-band region. (Author)

AD-618 001 Div. 25/3, 2/1

Harvard Coll. Observatory, Cambridge, Mass.
MAGNETOHYDRODYNAMIC FLOW AND FORCE-FREE FIELDS.
Scientific rept.,
by Donald H. Menzel. 3 Feb 64, 11p Rept. no. SR-3
Contracts AF19 628 3322, AF19 604 4962
Proj. 7649, Task 764906
AFCRL 65-247
Unclassified report

Pub. in Astrophysica Norvegica v9 n23 p225-32
Oct 1964(Copies available only to DDC users).

Descriptors: (*Magnetohydrodynamics, Gas flow), Magnetic fields, Equations, Compressible flow, Magnetic pinch, Electric currents, Motion.

The paper examines the equations of motion for a compressible gas of infinite conductivity in a magnetic field, in particular the cases of motion along the field, force-free fields, and motion along the current system. (Author)

AD-618 002 Div. 25/8

Southwest Research Inst., San Antonio, Tex.
Dept. of Mechanical Sciences.
TRANSIENT HEAT CONDUCTION AT HIGH THERMAL FLUX,
by U. S. Lindholm, E. J. Baker, and R. C. Kirkpatrick.
1963, 4p
Contract AF49 638 1119, Proj. 9782, Task 978202
AFOSR 65-1158
Unclassified report

Pub. in Journal of Heat Transfer Feb 1965 (Copies not available to DDC or Clearinghouse customers). Presented at the Winter Annual Meeting, Philadelphia, Pa., November 17-22, 1963, of the American Society of Mechanical Engineers.

Descriptors: (*Thermal conductivity, Copper), Melting, Thermal diffusion, Heat transfer, High-temperature research.

Transient heat conduction in a copper rod was studied using an arc-imaging furnace to supply pure radiant

thermal energy at flux levels up to 1000 cal sq cm-sec. No significant effects were observed attributable to the rate of heating up to and through melting at the surface. Transient temperature profiles agree well with theory and melting was initiated at its equilibrium temperature. The dynamics of the vaporization process are more uncertain. (Author)

AD-618 004 Div. 25/3, 25/6

Pittsburgh Univ., Pa.
A STUDY OF ELECTRICAL AND THERMAL RESISTIVITIES OF Fe, Co AND Ni USING A TWO-BAND MODEL,
by L. Colquitt and D. A. Goodings. 1964, 3p
Grants AF AFOSR196 63, NSF G11309, Proj. 9761, Task 976101
AFOSR 65-0807

Unclassified report

Pub. in International Conference on Magnetism. Proceedings, Nottingham (England) p29-31 Sep 1963 (Copies available only to DDC users).

Descriptors: (*Resistance(Electrical), Transition elements), (*Thermal properties, Transition elements), (*Transition elements, Magnetic properties), (*Magnetic properties, Atomic energy levels), Iron Cobalt, Nickel, Electrons, Spin, Scattering, Solid state physics.

A description is given of recent calculations of the contributions to the electrical resistivity rho and the thermal resistivity W of Fe, Co and Ni due to 'spin disorder' scattering, i.e. the scattering of conduction electrons by spin waves occurring through the s-d exchange interaction. The single-band theory of Kasuya and others has been extended to a model consisting of two spherical energy bands, representing the 4s-4p conduction band and the itinerant d electrons in these metals. At the lowest temperatures the electrons are mainly scattered within each band, but at higher temperatures scattering involving s-d transitions becomes important and gives contributions to rho and W about an order of magnitude larger than the single-band contributions. The approximations of the model are discussed in some detail, and estimates of certain parameters of the model are obtained by comparing the calculations with the experimental results of White and Woods. (Author)

AD-618 013 Div. 25/4, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SEMICONDUCTORS GENERATE LIGHT,
by N. G. Basov. 7 Jul 65, 6p
Rept. no. FTD-TT-65-337
TT 65-62625

Unclassified report

Unedited rough draft trans. from Pravda (USSR) 5 Jan p3 1964.

Descriptors: (*Semiconductor devices, Lasers), (*Lasers, Semiconductors), (*Light, Lasers), Optical phenomena, Crystal oscillators, Quantum mechanics, Reviews, USSR.

Brief review of the progress of Soviet scientists in the development of semiconductor quantum generators (lasers).

AD-618 014 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
LONGITUDINAL SHOCK ALONG A CYLINDRICAL SHELL,
by L. A. Movsisyan. 13 Jul 65, 8p
Rept. no. FTD-TT-65-362
TT 65-62626

Unclassified report

Unedited rough draft trans. of Aksdemiya Nauk Armyaiskoi SSR, Erevan. Izvestiya. Seriya Fiziko-Matematicheskikh Nauk v17 n5 p43-6 1964.

Descriptors: (*Structural shells, Impact shock), (*Cylindrical bodies, Impact shock), Elasticity, Loading-(Mechanics), Partial differential equations, USSR.

A discussion is given of a circular orthotropic cylindrical shell with length l and radius r. The main elasticity tendencies of the material of the shell coincide with curvature lines of the shell, which were selected in role of coordinate lines. One of the shell tips (x = O) is clamped down, and the second one (x = l) - free. The free end of the shell is subjected to impact in longitudinal direction by a rigid mass. It is assumed, that striking (impact) load is uniformly distributed over the free end of the shell, and also, that after the impact the striking body is moving all the time with the shell.

AD-618 015 Div. 25/4, 20/9
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
MASS MONOCHROMATOR WITH DOUBLE FOCUSING IN A MAGNETIC SECTOR FIELD,
by V. A. Molchanov and V. G. Telkovskii.
13 Jul 65, 15p Rept. no. FTD-TT-65-697
TT 65-62627

Unclassified report

Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 1: Matematika, Mekhanika (USSR) v16 n1 p22-8 1961.

Descriptors: (*Mass spectroscopy, Spectrum analyzers), (*Spectrum analyzers, Mass spectroscopy), (*Particle accelerator techniques, Mass spectroscopy), Ion sources, Ion accelerators, Ion beams, Focusing, Magnetic fields, Isotope separation, Plasma physics, Nuclear physics, Electron optics, USSR.

An arrangement designed for experiments with ion beams and also for separating small quantities of isotopes, is described. The use of double focusing in a magnetic sector field made it possible to obtain a dispersion of 1 cm per 1% relative mass difference and an ion current density close to the focus up to 2 - 3 ma/sq cm for a relatively small magnet weight. (Author)

AD-618 019 Div. 9/4
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
THE WAVE RESISTANCE OF BODIES OF REVOLUTION,
by George P. Weinblum. May 51, 62p
Rept. no. 758
Proj. NS715 084

Unclassified report

Descriptors: (*Bodies of revolution, Hydrodynamics), (*Hydrodynamics, Bodies of revolution), Numerical analysis, Integrals, Polynomials.

Following a brief review of prior work on wave resistance of bodies of revolution carried out by Havelock and Weinblum a discussion is presented of the approximate relations between the shape of sectional-area curves and of hydrodynamic irregularity distributions. The latter are expressed by polynomials, which lend themselves to an evaluation of the basic resistance integrals by computing

intermediate integrals. Values of the functions thus obtained are tabulated in an appendix. These functions are then used to calculate the resistance of some simple bodies of revolution. Also investigated is how the resistance is influenced by asymmetry with respect to midship section. Distributions leading to bodies of least wave resistance are calculated, assuming rather severe restrictions. A rather complete set of resistance curves is given for an important family of bodies. (Author)

AD-618 020 Div. 25/6
CFSTI Prices: HC$3.00 MF$0.75

Watertown Arsenal Labs., Mass.
STRESSES IN THICK WALLED CYLINDERS.
Experimental rept.,
by R. Beeuwkes, Jr. 10 Oct 46, 70p
Rept. no. WAL-730/419

Unclassified report

Prepared for presentation to the International Congress for Applied Mechanics (6th), Paris, France, Sep 46
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Cylindrical bodies, Stresses), Thickness, Pressure, Loading(Mechanics), Strain(Mechanics), Fracture(Mechanics), Mathematical analysis.

The report contains: (1) Bore and outer surface stress and strain data for tubes, loaded with an axially symmetric approximately semi-infinite uniform bore pressure, and having wall ratios of 1.25, 1.50, 1.75, 2.00, 2.25, and 2.50; (2) A formula for use in analyzing and interpolating the stress and strain data; (3) Formulae for determining the influence of heat on strains; (4) Formulae for stress concentration and influence of crack depth on bursting pressure. (Author)

AD-618 023 Div. 25/8, 30/5
CFSTI Prices: HC$2.00 MF$0.50

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
School of Engineering.
INTERFEROMETER STUDY OF NATURAL CONVECTION INSIDE A HORIZONTAL CYLINDRICAL CAVITY.
Master's thesis,
by Richard Irwin Erb. Mar 65, 49p
Rept. no. GAM-65A/ME/65-3

Unclassified report

Descriptors: (*Convection, Cylindrical bodies), (*Interferometers, Convection), Glass textiles, Heat transfer, Tests.

An optical interferometer was used to observe the isotherms which developed within a horizontal fiberglass cylinder as it was non-uniformly heated in axial strips to a maximum wall temperature of 200 F. It was found that when single strips were heated separately, the local heat transfer coefficients at the cylinder wall adjacent to each heater reached a maximum value in the region 20 to 25 degrees below where the wall surface was vertical. Also, the magnitude of the coefficients increased with time for about the first six minutes of heating and then decreased slightly. Numerous photographs are included which show the isothermal patterns formed when various segments of the cylinder wall were heated. (Author)

AD-618 024 Div. 9/1, 9/5
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
School of Engineering.
STUDY OF HEAT TRANSFER FROM A HEATED CYLINDER IN TWO-PHASE, WATER-AIR FLOW.
Master's thesis,
by James F. Hoelscher. Mar 65, 55p
Rept. no. GAM-65A/ME/65-5

Unclassified report

Descriptors: (*Heat transfer, Cylindrical bodies), (*Fluid flow, Heat transfer), (*Cylindrical bodies, Heat transfer), Heat transfer coefficients, Air, Water, Mixtures, Stagnation point, Humidity.

The purpose of the study was to obtain experimental data on the effect of the water-to-air mass flow ratio in a horizontal, two-phase, air-water flow on the overall film heat transfer coefficient on a vertical cylinder, and to determine the variation of the local film heat transfer coefficient on a vertical cylinder, in a horizontal, two-phase air-water flow. A suitable apparatus was constructed, it consisted of a heated cylinder, a wind tunnel, nozzles, and temperature, power and pressure monitoring equipment. The two-phase flow was formed by spraying water into the wind tunnel air flow. It was found that introduction of water droplets into the airstream sharply increased the overall film heat transfer coefficient; and, after a water-to-air flow ratio of about 0.04, the heat transfer rate varied only slightly with increases in water-to-air ratio. At the peak condition noted in the study, overall film heat transfer coefficient was increased by a factor of 8.5 by the introduction of water into the airstream. Heat transfer from the cylinder occurs almost entirely on the front half of the cylinder with the maximum heat transfer rate at the stagnation point of 14.9 times that of dry air. (Author)

AD-618 027 Div. 25/8, 9/1, 21/4
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
School of Engineering.
CONVECTION AND RADIATION HEAT TRANSFER IN THE ENTRANCE REGION BETWEEN PARALLEL PLATES.
Master's thesis,
by William E. Mercer, III. Jun 65, 129p
Rept. no. GSP-65A/ME/65-2

Unclassified report

Descriptors: (*Heat transfer, Laminar flow), (*Laminar flow, Heat transfer), Thermal radiation, Differential equations, Covette flow, Thermodynamics, Thermal insulation, Nuclear propulsion, Annular nozzles, Iterative methods, Programming(Computers).

The effects of combined convection and radiation heat transfer for laminar flow between parallel plates are investigated, and an experimental study of the convection theory is made. The von Mises transformation is applied to the equations of motion and the convection energy equation; the equations are then written in finite difference form for numerical solution. For the combined heat transfer problem one plate is insulated and the other is maintained at a uniform temperature. The governing radiation equations are developed assuming black plates with the entrance and exit of the channel participating in the radiative energy exchange. The plates were in one of three configurations: both plates at uniform temperature, top plate heated and bottom plate insulated, or bottom plate heated with the top plate insulated. An interferometer was used in the investigation and the measured temperature profiles and Nusselt numbers are compared with theoretical values obtained from the numerical solution of the governing equations. (Author)

AD-618 031 Div. 25/4, 30/3
CFSTI Prices: HC$3.00 MF$0.75

Air Force Weapons Lab., Kirtland AFB, N. Mex.

PULSE LASER INSTRUMENTATION,
Rept. for Apr 62-Dec 63,
by Charles W. Bruce and Earl H. Collet.
Jun 65, 67p Rept. no. WL-TR-64-127
Proj. 8814; ARPA Order 313

Unclassified report

Descriptors: (*Lasers, Test equipment), Electromagnetic pulses, Energy, Intensity, Measurement, Calorimeters, Thermistors, Thermocouples, Impedance matching, Circuits, Integrators.

The development of the techniques and devices used to measure pulse laser output at the Air Force Weapons Laboratory is described. Included are discussions of principles, physical design, associated circuitry, and impedance-matching techniques. The instrumentation system consists of a total beam calorimeter suited to the laser energy range and an integrator whose signal is correlated to the calorimeter measurement. The calorimeter is either an absorbing surface or volume arranged so that the energy is well trapped. The surface absorber is a thermally isolated hollow silver sphere whose inner surface has been highly polished and whose heat capacity can be accurately calculated. The laser beam is admitted into the sphere at the focal point of a short-focal-length lens through a very small hole off center of the sphere. The volume absorber is cone-shaped as a result of various requirements and considerations. Thermistors or thermocouples are used to measure the resultant temperature rise. The use of these devices has several merits, chiefly high accuracy, stability, and relative simplicity. In addition, the devices lend themselves to the measurement of a wide range of energy densities; e.g., by variation of the diameter of the sphere in the first mentioned device. An entirely impedance-matched circuit was designed for the high-speed light-sampling diode. Several integration techniques were considered and three were selected; the one utilized depended on the experimental situation. (Author)

AD-618 043 Div. 25/8, 9/1
CFSTI Prices: HC$3.00 MF$0.50

Plasma Lab., Columbia, Univ., New York.
AN ELEMENTARY NUMERICAL TREATMENT OF THE BOLTZMANN EQUATION FOR A SIMPLE GAS WITH PARTICULAR ATTENTION TO WALL INTERACTION,
by Harold G. Elrod. May 65, 51p Rept. no. 17
Contract AF49 638 1254

Unclassified report

Descriptors: (*Kinetic theory, Gas flow), (*Transport properties, Couette flow), (*Couette flow, Kinetic theory), Integral equations, Nonlinear differential equations, Integral transforms.

Analysis of an numerical experiments connected with solution of the Boltzmann equation for a simple gas are described. Efforts are directed towards providing a better understanding of kinetic theory predictions for flow phenomena near a wall.

AD-618 044 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DISTRIBUTION OF THE PARTIAL PRESSURES OF NEGATIVE IONS IN THE POSITIVE COLUMN OF A LOW-PRESSURE DISCHARGE,
by A. M. Rezikyan, G. A. Galechyan, and V. V. Galechyan. 9 Jul 65, 12p Rept. no. FTD-TT-65-12
TT 65-62636

Unclassified report

Unedited rough draft trans. of Akademiya Nauk Armyanskoi SSR, Erevan. Izvestiya. Seriya Fiziko-Matematicheskikh Nauk, v16 n6 p117-24 1963.

Descriptors: (*Electric discharges, Pressure), (*Plasma medium, Pressure), Distribution, Discharge tubes, Vacuum, Gas ionization, USSR, Integration.

AD-618 046 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
NEWS OF THE ACADEMY OF SCIENCES OF THE USSR. PHYSICS SERIES, VOL. 28, NO. 6, 1964. (SELECTED ARTICLES),
7 Jul 65, 21p Rept. no. FTD-TT-65-657
TT 65-62638

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSR. Izvestiya. Seriya Fizicheskaya, v28 n6 p996-9, 1096-9 1964.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Semiconductors, Scientific research), Indium alloys, Phosphorus alloys, Intermetallic compounds, Films, Electrical properties, Conductivity, Vapor plating, Vacuum apparatus, Salt, Mica, Arsenic alloys, Hall effect, Temperature, Sulfur compounds, Selenium compounds, Antimony compounds, Synthesis(Chemistry), Single crystals, USSR.

Contents: Certain properties of thin indium phosphide layers, by Ya. A. Ugay, Ye. M. Averbakh, R. L. Fogel'son and V. A. Gol'dfarb; Certain electrical and galvanomagnetic properties of indisum arsenide films, by V. A. Kas'yan; Investigating certain physical properties of CuSbS2 and CuSbSe2 single crystals, by G. B. Abdullayev, R. Kh. Nani, Ya. N. Nasirov and T. G. Osmanov.

AD-618 047 Div. 9/1, 27/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EFFECT OF FLOW TWST ON THE CHARACTERISTICS OF NOZZLE GRIDS,
by G. A. Fillipov and Chzhun-tsien Wan. 7 Jul 65, 14p Rept. no. FTD-TT-65-686
TT 65-62639

Unclassified report

Unedited rough draft trans. of Teploenergetika (USSR) v11 n5 p54-7 1964.

Descriptors: (*Annular nozzles, Fluid flow), (*Fluid flow, Annular nozzles), Turbines, Fluid dynamic properties, USSR.

The results of the experimental investigation of annular nozzle grids with a flow twist at input are discussed.

AD-618 049 Div. 25/6, 20/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DEFINITION OF CERTAIN PARAMETERS OF SEMICONDUCTOR MATERIALS WITH HELP OF IRRADIATION OF p-n JUNCTIONS BY ELECTRONS,
by A. Shalpykov and E. M. Lobanov. 13 Jul 65, 7p
Rept. no. FTD-TT-64-1159
TT 65-62641

Unclassified report

Edited trans. of Akdemiya Nauk Uzbekskoi SSR, Tashkent. Izvestiya. Seriya Fiziko-Mathematicheskikh Nauk n6 p80-1 1961.

Descriptors: (*Semiconductors, Radiation damage), (*Photoelectric cells(Semiconductor), Radiation damage), (*Radiation damage, Semiconductors), Silicon, Electron bombardment, Solid state physics, USSR.

The action of an electron beam on silicon photocells with a barrier layer is investigated; in particular, the dependence of the current of a photocell irradiated by electrons on the energy of the electrons during its change from 0 to 30 Kev and on the intensity of the electron beam is examined.

AD-618 052 Div. 25/3, 15/1
CFSTI Prices: HC$1.00 MF$0.50

Brown Univ., Providence, R. I. Div. of Applied Mathematics.
CALCULATIONS OF THE CONDUCTIVITY OF A MEDIUM CONTAINING CYLINDRICAL INCLUSIONS BY THE METHOD OF ORTHOGONALIZED PARTICULAR SOLUTIONS.
Technical rept.,
by Philip Rabinowitz. Jun 65, 17p
Contract Nonr56236, Proj. NR044 309/8 2 63
Unclassified report

Supported in part by National Bureau of Standards.

Descriptors: (*Electrical conductance, Mathematical analysis), Cylindrical bodies, Boundary value problems, Potential theory, Partial differential equations.

Calculations of the conductivity of an infinite medium containing a square array of perfectly conducting cylindrical inclusions were carried out using the method of orthogonalized particular solutions. The results agree with those reported by Keller and Sachs using the method of finite differences. (Author)

AD-618 056 Div. 25/2
CFSTI Prices: HC$3.00 MF$0.75

Naval Ordnance Lab., White Oak, Md.
ON THE THERMAL EXPANSION AND STRUCTURE OF ANISOTROPIC MONATOMIC SOLIDS.
Doctoral thesis,
by D. John Pastine. Aug 65, 77p Rept. no. NOL-TR-65-22
Proj. FR105PA052
Unclassified report

Descriptors: (*Crystals, Anisotropy), (*Thermal expansion, Crystals), Equations of state, Differential equations, Solids, Crystal lattices.

The principle by which certain monatomic crystals exhibit face centered tetragonal symmetry have thus far escaped investigation. Knowledge of these principles is desirable since it would enable a determination of the anisotropic properties and behavior of such crystals under conditions which render experimental study unfeasible. For these reasons the report sets forth some principles which, on the one hand, explain the generally observed features of such crystals and on the other allow, at least qualitative, predictions of crystal behavior under conditions which presently preclude observation.

AD-618 057 Div. 9/1
CFSTI Prices: HC$3.00 MF$0.75

Harry Diamond Labs., Washington, D. C.
FLUID AMPLIFICATION. 14. PARAMETERS AFFECTING THE NOISE IN NO-MOVING-PARTS FLUID DEVICES,
by Richard N. Gottron and Sanford D. Weinger. 15 Apr 65, 92p Rept. no. TR-1283
Projs. DA1P014501A33B, 31100
Unclassified report

Descriptors: (*Fluid flow, Amplifiers), (*Amplifiers, Fluid flow), (*Noise, Fluid flow), Turbulence, Jets, Two-dimensional flow, Signal-to-noise ratio, Boundary layer, Stability, Partial differential equations.

The noise in fluid amplifiers is discussed. Previous work on free circular jets has been applied to confined two-dimensional jets to predict possible noise sources. Possible noise reduction techniques are considered, both in the interaction area of fluid amplifiers and in the design of receivers. Recommendations for future work and an extensive reference list are included. (Author)

AD-618 065 Div. 25/6, 14/8, 17/6, 17/5, 17/4
CFSTI Prices: HC$6.00 MF$1.50

Martin Co., Denver, Colo.
CRYOGENIC MATERIALS DATA HANDBOOK.
Progress rept. no. 2,
by F. R. Schwartzberg, S. H. Osgood, R. D. Keys, and T. F. Kiefer. Jul 65, 265p
Contract AF33 657 9161, Proj. 7381, Task 738106
ML TDR-64-280 Suppl.; PB 171 809 Rev. Suppl. 2
Unclassified report

See also AD-609 562.

Descriptors: (*Cryogenics, Materials), (*Handbooks, Cryogenics), (*Alloys, Cryogenics), (*Plastics, Cryogenics), Aluminum alloys, Stainless steel, Titanium alloys, Nickel alloys, Chromium alloys, Copper alloys, Iron alloys, Steel, Maraging steel, Nylon, Halocarbon plastics, Mechanical properties, Test methods, Thermal expansion, Copper.

AD-618 066 Div. 25/4
CFSTI Prices: HC$2.00 MF$0.50

Westinghouse Defense and Space Center, Baltimore, Md. Aerospace Div.
DEVELOPMENT OF MILLIMETER AND SUBMILLIMETER MASER DEVICES.
Interim technical rept. no 7, 1 Mar-30 Jun 65,
by W. E. Hughes, C. R. Kremenek, and W. E. Richards. Jul 65, 38p Rept. no. 490G
Contract AF33 657 10472, Proj. 4156, Task 415604
Unclassified report

Descriptors: (*Masers, Millimeter waves), Microwave equipment, Gain, Bandwidth, Cryogenics, X band, Rutile, Iron, Impurities, Aluminum compounds, Nitrates.

Measuring techniques for a zero field 81-gc maser and a 9.3-gc maser were improved. The improved techniques include new cavity designs, improved superheterodyne receivers, new dewar designs, and more reliable operation. Each improvement is described in detail. (Author)

AD-618 067 Div. 20/2, 20/9
CFSTI Prices: HC$1.00 MF$0.50

Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
HIGH ENERGY PHYSICS RESEARCH USING A 460 MEV SYNCHROCYCLOTRON.
Final rept.,
by Herbert L. Anderson. 14 Jul 65, 15p

Contract N6ori02022 Unclassified report

Descriptors: (*Nuclear physics, Synchrocyclotrons), (*Bibliographies, Nuclear physics), Elementary particles, Pions, Muons, Meson bombardment, Proton beams, Neutron beams, Radiochemistry.

Doctoral dissertations are listed for students who conducted their research with the cyclotron. Also given is a chronological list of published research.

AD-618 080 Div. 9/1
CFSTI Prices: HC$1.00 MF$0.50

Minnesota Univ., Minneapolis. School of Physics.
SUPERFLUID LIQUID HELIUM GYROSCOPE,
by J. B. Mehl and W. Zimmerman, Jr. 1965, 4p
Grant AF AFOSR62 316, Proj. 9767, Task 976701
AFOSR 65-1095
Unclassified report

Prepared for presentation at the New York Meeting of the American Physical Society, Jan 1965.

Descriptors: (*Liquefied gases, Helium), (*Helium, Fluid dynamic properties), (*Fluid mechanics, Helium), Vortices, Fluid flow, Gyroscopes, Spheres, Low-temperature research.

Persistent circulating currents of superfluid helium were observed by means of associated gyroscopic effects in an experiment. The gyroscope consists of a 3 cm-diameter glass sphere filled with powder, of particle size 0.001 cm, which forms fine channels through which the superfluid flows. The superfluid current is generated by steadily rotating the sphere about a vertical axis while cooling through the lambda-point and then stopping the sphere's rotation at a lower temperature. The sphere is mounted so that it subsequently can be tipped through 90 degrees about a horizontal axis and the vertical component of torque needed to carry out this tipping measured. By this means repeated measurements of the persisting angular momentum can be made, assuming the angular momentum to tip with the sphere. With an initial angular velocity of rotation of 0.28 radians/sec, measurements of a persisting angular momentum have been repeated up to 40 times during a period of 100 minutes showing no decay of the motion during that period to an accuracy of ± 10%. (Author)

AD-618 087 Div. 25/2, 25/3
CFSTI Prices: HC$2.00 MF$0.50

Pennsylvania Univ., Philadelphia.
MAGNETIC ORDERING IN CUBIC CRYSTALS WITH FIRST AND SECOND NEIGHBOR EXCHANGE.
Technical rept.,
by R. A. Tahir-Kheli, H. B. Callen, and H. Jarrett.
Jun 65, 32p Rept. no. TR-23
Contract Nonr55136
Unclassified report

Descriptors: (*Crystal lattices, Magnetic properties), (*Magnetism, Field theory), Spin, Stability, Ferromagnetism, Antiferromagnetism, Symmetry(Crystallography), Excitation, Transition temperature, Green's function, Manganese compounds, Europium compounds, Chalcogens, Phase studies.

The problem of stability of various ferromagnetic and antiferromagnetic spin configurations is considered. Simple cubic, face-centered cubic, and body-centered cubic lattices are analyzed, for all possible ratios of the strengths of the nearest-neighbor and next-nearest-neighbor exchange constants (all other exchange constants are neglected), and for all temperatures. The calculations are carried out by a Green function 'random phase' approximation. The results are presented in terms of phase diagrams, and the nature of the instabilities at the phase boundaries is discussed. (Author)

AD-618 093 Div. 25/8, 9/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EXPERIMENTAL STUDY OF HEAT AND MASS TRANSFER DURING TRANSPIRATION COOLING OF DIFFERENTLY SHAPED BODIES,
by G. T. Sergeev and L. A. Sergeeva. 13 Jul 65, 15p
Rept. no. FTD-TT-65-785
TT 65-62650
Unclassified report

Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v6 n12 p3-10 1963.

Descriptors: (*Heat transfer, Evapotranspiration), (*Evapotranspiration, Heat transfer), (*Cooling, Evapotranspiration), Gas flow, Turbulence, Water, Evaporation, Bodies of revolution, Thermodynamics, USSR.

Results are given from experimental studies of the process of heat and mass transfer in the case of the evaporative cooling with water of a sphere, disc or cone when variously oriented in a turbulent air flow. (Author)

AD-618 098 Div. 9/4
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN EXPERIMENTAL INVESTIGATION OF FLUID FLOW THROUGH SQUARE-EDGED ORIFICES LOCATED IN A ROTATING DISK.
Master's thesis,
by Clark David Carlen. Mar 65, 65p
Rept. no. GAM-65A/ME/65-2
Unclassified report

Descriptors: (*Orifices, Fluid flow), (*Disks, Orifices), Rotation, Jets, Velocity, Pressure, Pipes.

Previous investigators have shown that the discharge coefficient of circular orifices may be markedly reduced if located in a rotating disk. The thesis confirms the fact that orifice velocity and the pressure differential across the rotating disk are parameters affecting the discharge coefficient. In addition, fluid (air) density and orifice configuration were found to have a large effect on the discharge coefficient of rotating orifices. Disk thickness was not found to have an appreciable effect. The explanation for these effects is that the fluid enters the rotating orifice at an angle, which in turn decreases the orifice jet area. (Author)

AD-618 100 Div. 25/1, 9/1
CFSTI Prices: HC$4.00 MF$1.00

Georgia Inst. of Tech., Atlanta.
THE EFFECT OF A RESONANT ACOUSTIC FIELD ON LAMINAR FLOW IN A CIRCULAR TUBE.
Interim rept.,
by Kenneth R. Purdy, Thomas W. Jackson, Donald A. Willoughby, H. Grady Keith, and Charles E. Willbanks.
May 65, 124p
Contract AF33 616 8396, Proj. 7063, Task 706301
ARL 65-96
Unclassified report

Descriptors: (*Laminar flow, Acoustics), (*Acoustics, Laminar flow), Compressible flow, Pipes, Sound, Resonance, Vibration, Vortices, Heat transfer, Mathematical models.

The analytical and the experimental study considered flow in a circular tube. The conclusions from these investigations are: (1) A resonant acoustic field will produce steady secondary flow in a channel or a circular tube with or without through flow; (2) the size of the standing vortices which are formed in the case of through flow is, to a first approximation, solely a function of the parameter M/sq M sub 0; (3) the effect of sound on the local heat transfer rate for a horizontal isothermal tube as obtained by Jackson is qualitatively explained in terms of the flow field which was observed experimentally and predicted analytically, and (4) the sound threshold levels obtained by Eastwood (the sound levels below which a resonant acoustic field does not locally affect the heat transfer rate) correspond to conditions for which M/sq M sub 0 approx 63. (Author)

AD-618 103 Div. 9/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Giannini Controls Corp., Malvern, Pa.
Astromechanics Research Div.
RESEARCH STUDIES IN PROPORTIONAL FLUID STATE CONTROL COMPONENTS, PART 2,
by H. A. Curtiss, D. J. Liquornik, and S. K. Ho.
Mar 65, 72p Rept. no. ARD-TR-013-02
Contract DA36 034ORD3722RD
Unclassified report

Descriptors: (*Fluid flow, Control systems), (*Control systems, Fluid flow), Fluid mechanics, Gases, Power, Performance(Engineering), Jets, Configuration, Boundary layer control systems, Optimization, Programming(Computers), Performance(Engineering), Fluid dynamic properties, High-temperature research, Pneumatic systems.

Results of experimental research performed on the Double Leg Elbow Amplifier (DLEA) are presented. The DLEA with a straight active leg, was operated in a closed configuration. Tests were conducted with hot gas as a working medium, and two amplifiers were coupled and tested as a two stage amplifier. The DLEA was optimized for power gain. In addition, analytical techniques were expanded to include the effect of the splitter on the DLEA performance. It was concluded that the optimized Double Leg Elbow Amplifier would be excellent in control applications demanding high mass flow gains and high power gains especially when used to control gasses at extremely high temperatures. (Author)

AD-618 106 Div. 25/4
CFSTI Prices: HC$1.00 MF$0.50

Spectra-Physics, Inc., Mountain View, Calif.
HIGH POWER GAS LASER IN THE VISIBLE.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 65,
by Arnold L. Bloom and Robert L. Byer. 31 Mar 65, 20p
Contract DA28 043AMC00194E, Proj. 1P622001A05603
Unclassified report

See also AD-613 197.

Descriptors: (*Lasers, Helium group gases), (*Helium group gases, Lasers), Argon, Kraypton, Xenon, Mercury, Spectra(Visible + ultraviolet), Atomic properties.

Work during this quarter has consisted of spectroscopic investigation of the laser emission from C-W argon, krypton, and xenon lasers and from the pulsed mercury-helium laser. The work with the noble gas ion lasers has indicated widths of 3,000 to 5,000 megacycles, with clearly resolved Zeeman splitting in fields over 700 gauss. The mercury measurements have resolved the isotope shift in the 6150 A line and indicated a line width of about 500 megacycles. Details of the exact wavelength measurement of the mercury wavelength are presented in this report. (Author)

AD-618 124 Div. 9/4, 30/2

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
ON USING AN ANALOG COMPUTER TO STUDY HYDRODYNAMIC STABILITY,
by Shu-Kwan Chan and Edward F. Kurtz, Jr. 1 Oct 64, 8p
Contract Nonr184185, Proj. RR003 08 01
Unclassified report

Research done in cooperation with Dept. of Mechanical Engineering, Mass. Inst. of Tech., Cambridge.
Pub. in IEEE Transactions on Electronic Computers vEC-14 n2 p233-8 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Fluid dynamic properties, Stability), (*Analog computers, Hydrodynamics), Differential equations, Noise, Viscosity, Boundary layer, Flat plate models, Digital computers, Integral equations.

The use of analog computers to study hydrodynamic stability is complicated by the fact that the governing differential equation has two rapidly varying solutions (one growing and one decaying), and two which are well behaved. Thus, errors in setting initial conditions and noise in an analog computer excite the rapidly growing solution, making the computer behave in an unstable way. This unstable behavior has its origin in the role played by fluid viscosity. Approximate techniques are discussed whereby these instabilities can be circumvented. The techniques are applied to the case of the Blasius boundary layer on a flat plate, and the results are compared with results available in the literature, obtained with a digital computer. The analog- and digital-computer results are in good agreement. (Author)

AD-618 127 Div. 25/6, 15/1
CFSTI Prices: HC$1.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
SOME GENERAL PROBLEMS IN THE THEORY OF STABILITY OF MOTION,
by N. P. Erugin. 1965, 16p Rept. no. RSIC-435
TT 65-62651
Unclassified report

Trans. of Prikladnaya Matematika i Mekhanika (USSR) v15 n2 p227-36 1951.

Descriptors: (*Motion, Stability), (*Stability, Motion), Theory, Differential equations, USSR.

Proceeding from the general idea of Vintner's proofs of certain theorems, proofs are established for other theorems. (Author)

AD-618 128 Div. 25/6, 15/1
CFSTI Prices: HC$1.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
A. M. LYAPUNOV'S METHOD AND PROBLEMS IN STABILITY IN THE LARGE,

by N. P. Erugin. 1965, 19p Rept. no. RSIC-434
TT 65-62652

Unclassified report

Trans. of Prikladnaya Matematika i Mekhanika (USSR) v17 n4 p389-400 1953.

Descriptors: (*Motion, Stability), (*Stability, Motion), Differential equations, Power series, Harmonic analysis, USSR.

AD-618 137 Div. 25/3, 15/1
CFSTI Prices: HC$1.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
CAPACITANCE BETWEEN THIN-FILM CONDUCTORS DEPOSITED ON A HIGH-DIELECTRIC-CONSTANT SUBSTRATE.
by H. R. Kaiser and P. S. Castro. 1965, 3p
Rept. no. 6-59-61-2

Unclassified report

Descriptors: (*Capacitance, Boundary value problems), Mapping(Transformations), Electrical conductance, Dielectrics, Integrals.

The capacitance between two thin-film conductors deposited on a high-dielectric-constant substrate is calculated by means of the Schwarz-Christoffel transformation. Numerical results are calculated and compared with experimental results. (Author)

AD-618 138 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Innsbruck Univ., (Austria).
MHD OF A QUASINEUTRAL PLASMA WITH VANISHING INTERNAL FRICTION AND HEAT CONDUCTIVITY AND FINITE ELECTRICAL CONDUCTIVITY.
Scientific rept.,
by H. Friedel. 10 Mar 65, 23p Rept. no. SR-24
Contract AF61 052 675, Proj. 9752, Task 975201
AFOSR 65-1314

Unclassified report

Descriptors: (*Magnetohydrodynamics, Plasma medium), (*Electrical conductance, Plasma medium), Electric currents, Thermal conductivity, Friction, Fluid mechanics, Partial differential equations, Iterative methods, Boundary value problems.

The MHD basic equations for a quasineutral plasma are considered in the 1-dimensional unsteady and 2-dimensional steady cases. If the displacement current is neglected, the 1-dimensional unsteady system is parabolic, and the 2-dimensional steady system is elliptic. The influence of electrical conductivity on MHD solutions is investigated, and 3 methods for solving the general MHD equations are given. (Author)

AD-618 140 Div. 25/8, 25/1
CFSTI Prices: HC$4.00 MF$0.75

Georgia Inst. of Tech., Atlanta.
INVESTIGATIONS OF THE EFFECT OF ACOUSTIC VIBRATIONS ON CONVECTIVE HEAT TRANSFER.
Final rept.,
by Thomas W. Jackson, Kenneth R. Purdy, Henry G. Keith, and Robert S. Rudland. May 65, 109p
Contract AF33 616 8396, Proj. 7063, Task 706301
ARL 65-97

Unclassified report

Descriptors: (*Heat transfer, Mechanical waves), (*Sound signals, Vibration), Reynolds number, Turbulence, Laminar flow, Heat transfer coefficients, Sound, Pressure, Anemometers.

The experimental and analytical results obtained for the heat transfer coefficients in an isothermal tube which had an unheated starting length are presented. Data on heat transfer coefficients for Reynolds numbers from approximately 10,000 to 65,000 are presented for conditions of no-sound (without resonant acoustic vibrations) and for conditions of a resonant frequency in the tube of approximately 90 cps. For turbulent flow the effect of the resonant sound field is to reduce the heat transfer coefficients. A half-wave length periodic effect on the local heat transfer coefficient was noted. The local values of the turbulent heat transfer coefficients are correlated in relation to the no-sound values as a function of U sq/Vc, where U is the maximum sound particle velocity, V is the mean through flow velocity and c is the speed of sound. The parameter U sq/Vc was determined to have a theoretical basis from the solution of the energy equation for the laminar flow situation with sound. The analytical solution for the local heat transfer coefficient for laminar flow in a channel is given and compared to the results obtained in the heat transfer tube. A preliminary determination of velocity profiles by means of a hot wire anemometer for both no-sound and sound conditions, indicated that the sound tends to alter the profile. (Author)

AD-618 143 Div. 20/2

National Research Council of Canada, Ottawa (Ontario).
LIFETIME OF THE 103 keV LEVEL IN 93Np237,
by J. L. Wolfson and W. R. Dixon. 5 Oct 64, 16p
Rept. no. NRC-8289

Unclassified report

Pub. in Nuclear Physics v64 p433-8 1965 (Copies available only to DDC users).

Descriptors: (*Neptunium, Nuclear energy levels), (*Half life, Neptunium), Internal conversion, Electrons, Doppler effect, Alpha decay, Americium, Isotopes.

The half-life of the 103 keV level in 93Np237 has been found to be (8±4) X 10 to the -11th power sec. The experimental method utilizes the Doppler shift of 26 keV conversion electrons emitted from the 103 keV level following alpha decay of Am241. These electrons are examined in a high resolving power beta-ray spectrometer. The distribution of electrons is compared with the distribution obtained when the conversion electrons are successively decelerated and accelerated by an electrostatic field near the source. A finite lifetime results in a net acceleration of the conversion electrons. A method of analysis has been developed which enables the lifetime to be measured in terms of the resulting distortion of the original distribution. (Author)

AD-618 147 Div. 25/4

National Research Council of Canada, Ottawa (Ontario).
Div. of Applied Physics.
DIFFRIMOSCOPY,
by Guy Lansraux. 26 Feb 65, 6p
Rept. no. NRC-8440

Unclassified report

Pub. in International Journal of Scientific Metrology v1 n2 p31-6 Apr 1965 (Copies available only to DDC users).

Descriptors: (*Diffraction, Optical images), (*Optical images, Diffraction), Microscopy, Resolution.

The experiment called in French 'strioscopie' has

been restudied. It is a particular case of diffrimoscopy, a field of optics which involves image formation by using only diffracted light. Diffrimoscopy is presented on the one hand as a tool for investigating the interaction of matter and light, and on the other hand as an image forming process that can be successfully applied to metrology. The profile of an object illuminated by a coherent beam, emits diffracted light which is focussed in a diffrimoscopic image. The main characteristics of such images are presented and illustrated by photographs. Their usefulness for metrology is brought out and the principle of the profiloscope briefly discussed. This instrument surpasses in performance the conventional profile projector. Attention is drawn to various characteristics of diffrimoscopic images which contribute fundamentally to the understanding of diffraction. A set of photographs shows a progressive transition from normal diffrimoscopy to ultramicroscopy. (Author)

AD-618 149 Div. 25/2, 20/3

National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
THE UNIT CELL AND SPACE GROUP OF SF3.BF4,
by L. D. Calvert and J. R. Morton. 16 Dec 63, 1p
Rept. no. NRC-7908
Unclassified report

Pub. in Acta Crystallographica v17 p613 1964 (Copies available only to DDC users).

Descriptors: (*Crystal lattice defects, Radiation damage), (*Radiation damage, Crystals), Sulfur compounds, Fluorine compounds, Boron compounds.

Single-crystal X-ray data were obtained to assist in the interpretation of electron spin resonance (ESR) spectra of radiation damaged crystals of SF3.BF4.

AD-618 150 Div. 25/2, 20/2, 25/8

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Chemistry.
THE TEMPERATURE VARIATION OF THE SCATTERING PROPERTIES OF CRYSTALS,
by L. S. Salter. 1965, 37p
Unclassified report

Pub. in Advances in Physics (Philosophical Magazine Supplement) v14 n53 p1-37 Jan 1965 (Copies available only to DDC users).

Descriptors: (*Crystal lattices, Neutron scattering), (*Neutron scattering, Crystal lattices), (*Thermal properties, Crystal lattices), Neutron cross sections, Incoherent scattering, Thermal expansion, Phonons, Mossbauer effect, Temperature, Vanadium, Silicon, Germanium, Copper.

It is shown how thermodynamic data (heat capacity, thermal expansion, etc.) may be used to estimate accurately certain scattering properties of crystals, assuming the validity of the quasi-harmonic approximation of lattice dynamics. In particular, Debye-Waller factors and incoherent neutron scattering cross sections can be readily correlated with thermodynamic data even though the form of the lattice frequency distribution of the crystal is not known. Thermodynamic data for vanadium, silicon, germanium and copper have been analysed and the results used to illustrate the accurate estimation of the following entities: Debye-Waller factor, total incoherent neutron scattering cross section, differential incoherent neutron corss section in the weak-binding approximation and in the n-phonon approximation. The application of the method to Mossbauer effect phenomena is also discussed. Definite criteria are suggested for deciding the conditions under which the substitution of the Debye distribution for the actual frequency distribution of a crystal leads to acceptable estimates of one or more properties of the lattice vibrations. (Author)

AD-618 153 Div. 25/8, 25/6, 25/2

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Physics.
SOLID HELIUM AND ITS MELTING CURVE,
by J. S. Dugdale. 1964, 43p Rept. no. NRC-8016
Unclassified report

Reprint. (Copies available only to DDC users).

Descriptors: (*Cryogenics, Helium), (*Solidified gases, Helium), (*Helium, Melting), Thermal properties, Phase studies, Stable isotopes, Specific heat, Volume, Compressive properties, Nuclear spins, Crystal lattices, Crystal structure, Stability, Thermal conductivity, Entropy, Pressure, Canada.

An account is given of the properties of solid helium (both stable isotopes), and the extent to which they can be accounted for on the basis of simple theories is discussed. The main emphasis is on the thermodynamic properties. This is followed by a brief discussion of the melting curves of the two isotopes with particular reference to their behavior at low temperatures where their different spin properties become of crucial importance.

AD-618 154 Div. 25/2

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Physics.
DISLOCATION DISTRIBUTION IN DEFORMED COPPER SINGLE CRYSTALS,
by Z. S. Basinski. 22 Jun 64, 19p
Rept. no. NRC-8301
Unclassified report

Pub. in Discussions of the Faraday Society n38 p93-102 1964 (Copies available only to DDC users).

Descriptors: (*Copper, Crystal lattice defects), (*Single crystals, Copper), Deformation, Foils, Microstructure, Canada.

Observations of dislocation distribution in copper single crystals oriented for single glide and deformed at low temperatures are described. In stage I the dislocation population consists mainly of bundles of long edge dislocations belonging to the primary glide system. They are distributed very non-uniformly with dense clumps separated by large areas of perfect material. The dislocations become more tangled with increasing deformation until in stage II they consist mainly of networks lying approximately parallel to the active glide plane and dense clumps of primary edge dislocations. Large differences in distribution are observed in areas near to and far from deformation bands. The results of thin foil observations are compared with data obtained by other methods, e.g., etch pitting and slip lines and their significance are discussed. (Author)

AD-618 157 Div. 25/6

National Research Council of Canada, Ottawa (Ontario).
ENERGY TRANSFER IN POLYACENE SOLID SOLUTIONS IV: A BIBLIOGRAPHY FOR 1963,

by F. R. Lipsett. 1965, 37p Rept. no. NRC-8084
Unclassified report

Pub. in mono. Progress in Dielectrics, London, 1965 p149-81 (Copies available only to DDC users).

Descriptors: (*Polycyclic compounds, Luminescence), (*Luminescence, Polycyclic compounds), Solid solutions, Energy, Spectroscopy, Quantum mechanics, Atomic energy levels, Phosphorescence, Excitation, Transport properties, Molecular structure, Photoconductivity, Semiconductors, Crystal growth, Bibliographies, Canada.

The energy transfer process in solids has most commonly been studied in systems of the polyacenes and related molecules, and the literature connected with the process forms the subject matter of this bibliography. In order to understand the process thoroughly it is necessary not only to be aware of the theories and experimental results on energy transfer itself, but also to have some knowledge of the spectra of the molecules by themselves, of the crystal structure of the compounds, and so on. Also, since the spectra of the polyacenes are much the same whether the molecules are in the solid or gaseous phase or in liquid solutions, a knowledge of the latter often reveals analogies which are of much help in explaining the transfer process in solids. A large part of the bibliography is therefore concerned with subjects related to energy transfer, rather than with the transfer process itself. On the other hand, no attempt has been made to include all the papers dealing, say, with naphthalene or anthracene, nor to include papers on benzene. (Author)

AD-618 158 Div. 25/2, 4/3

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Chemistry.
CRYSTAL STRUCTURE OF HETERATISINE HYDROBROMIDE MONOHYDRATE,
by Maria Przybylska. 23 Jul 64, 5p
Rept. no. NRC-8370
Unclassified report

Pub. in Acta Crystallographica v18 pt3 p536-40 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Alkaloids, Crystal structure), (*Crystal structure, Alkaloids), Polycyclic compounds, N-heterocyclic compounds, Lactones, Bromides, Hydrates, Molecular structure, Chemical bonds, Fourier analysis, Least squares method, Canada.

The space group of heteratisine hydrobromide monohydrate, C22H33O5N.HBr.H2O is P2 sub 1 and the unit-cell dimensions are: a = 8.96, b = 14.54, c = 8.55 A, beta = 90 degrees 40', Z = 2. The structure was solved from a three-dimensional Fourier synthesis by the heavy-atom method. No chemical assumptions were made, except that the nitrogen atom was identified by comparison of the skeleton with that of lycoctonine. Refinement was carried out by the least-squares method. (Author)

AD-618 169 Div. 25/2, 4/3

National Research Council of Canada, Ottawa (Ontario). Div. of Pure Physics.
THE CRYSTAL STRUCTURE OF 2,7-DIACETOXY-TRANS-15,16-DIMETHYL-15,16-DIHYDROPYRENE,
by A. W. Hanson. 25 May 64, 6p
Unclassified report

Pub. in Acta Crystallographica v18 pt4 p599-604 Apr 1965
(Copies available only to DDC users).

Descriptors: (*Aromatic compounds, Crystal structure), (*Polycyclic compounds, Crystal structure), (*Crystal structure, Polycyclic compounds), Esters, Molecular structure, Chemical bonds, X-ray diffraction analysis, Scintillation counters, Canada.

The crystal is monoclinic P2(1)/a. At room temperature a=20.07, b=7.56, c=5.88 A, beta=96.52, Z=2, formula C22O4H20. The structure was determined from a three-dimensional Patterson synthesis, and refined by least-squares procedures. Two sets of intensity data were used independently. One was collected at room temperature with the use of a scintillation counter; the other was recorded on Weissenberg photographs at - 130C, and estimated visually. The 14 peripheral atoms of the pyrene nucleus are approximately coplanar, and appear to form an aromatic system. (Author)

AD-618 178 Div. 25/8, 25/4, 24/2, 9/5

Brown Univ., Providence, R. I.
THE ESTIMATION OF THE TEMPERATURE PROFILE IN A LAMINAR BOUNDARY LAYER WITH A SCHLIEREN METHOD.
Revised ed.,
by P. D. Richardson. 11 Nov 64, 12p
ARL 65-149
Unclassified report

Pub. in International Journal of Heat and Mass Transfer v8 p557-66 1965 (Copies available only to DDC users). Revision of manuscript submitted 2 Jul 64.

Descriptors: (*Laminar boundary layer, Thermal properties), (*Schlieren photography, Laminar boundary layer), Heat transfer, Optical analysis, Light, Deflection, Heat, Convection, Refractive index.

Schlieren methods for heat-transfer measurement make use of ray deflections due to gradients of refractive index. The analysis of ray deflections is recapitulated briefly, and an experimental technique is described. A comparison between measured ray deflections and those predicted from analysis is made for natural convection over a horizontal heated cylinder, and good agreement is found. A transcendental temperature profile approximation function is described, and it is shown that this also gives good quantitative agreement with measured ray deflections. Finally, procedures are given by which it is possible to estimate the distribution of temperature and temperature gradient in a thermal boundary layer from ray deflection measurements, making use of the approximation function. The optical technique is established as a practical tool for quantitative study of temperature profiles in laminar boundary layers. (Author)

AD-618 188 Div. 25/7

University of Western Ontario, London. Dept. of Physics.
A THEORETICAL STUDY OF THE O2X3Σg(-)-B3Σu(-) PHOTODISSOCIATION CONTINUUM,
by W. R. Jarmain and R. W. Nicholls. 7 May 64, 11p
Grants AF AFOSR62 236, NsG349, Proj. 9768, Task 976801
AFOSR 65-1093
Unclassified report

Pub. in Proceedings of the Physical Society v84 p417-24 1964 (Copies available only to DDC users).

Descriptors: (*Electron transitions, Moments), (*Continuous spectra, Oxygen), (*Oxygen, Dissociation), Photochemistry, Quantum mechanics.

Franck-Condon densities in the Schumann-Runge photodissociation continuum were calculated for realistic Klein-Dunham potentials. They are combined with measured valves of absorption coefficient to study the variation of electronic transition moment in the continuum. For comparison, Franck-Condon factors were used in conjunction with measured oscillator strengths to show the behavior of the transition moment for the V'=O progression of bands. It appears probable that the transition moment is continuous through the dissociation limit. (Author)

AD-618 193 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

Warner and Swasey Co., Flushing, N. Y.
SPECTROSCOPIC STUDIES OF ARGON AND NITROGEN PLASMAS AT REDUCED PRESSURE. TEMPERATURE DISTRIBUTIONS IN PLASMAJETS AND WALL-STABILIZED ARCS.
Final technical rept.,
by Lothar Klein and Harold J. Babrov. May 65, 47p
Contract AF33 615 1178, Proj. 7063, Task 706303
ARL 65-92

Unclassified report

Descriptors: (*Plasma medium, Temperature), (*Optical analysis, Plasma medium), (*Plasma jets, Nitrogen), (*Electric arcs, Argon), Low-pressure research, Shock waves, Atomic spectroscopy.

Stationary plasmas at reduced pressure (0.02 - 0.1 atm.) were studied by two different experimental approaches, the plasmajet and the wall-stabilized arc. The nitrogen plasmajet at low pressure is characterized by the appearance of a shock front (Mach disc) and exhibits pressure and temperature gradients. A method based on the atomic Boltzmann plot in absolute intensity units was used to obtain both the pressure and the temperature distribution. A wall-stabilized arc device with wide confining channel proved to be well suited for obtaining a high current (250 A), low pressure (0.1 atm.) argon arc. Core temperatures above 16,000 K were determined and a high degree of ionization observed. The absence of pressure gradients makes the modified wall-stabilized arc a useful tool for research at reduced pressure, but problems of arc stability and symmetry remain to be solved. The wavelengths of several new lines in the argon and nitrogen spectrum were determined, and a strong triplet in the near ultraviolet could be classified as belonging to the transition 3s 2P - 5p 2D of N I. (Author)

AD-618 195 Div. 25/6
CFSTI Prices: HC$2.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
VARIABILITY OF CLOSED-BOX DIFFUSION OF BORON INTO SILICON,
by E. P. Dudley, R. J. Anstead, and C. H. Klute.
20 May 65, 38p Rept. no. TR-1290
Projs. 1N523801A300, HDL96300

Unclassified report

Descriptors: (*Boron, Diffusion), (*Diffusion, Boron), (*Silicon, Semiconductors), Transport properties, Solid state physics, Heat of activation, Surface properties, Resistance(Electrical), Boric acids, Silicic acids.

A study of the variability of the closed-box diffusion of boron into silicon has been made, using boric acid and silicic acid mixtures as boron sources. Two dilute sources (0.1 wt-pct boric acid and 10 wt-pct boric acid) have been examined in detail to determine how well junction depths, sheet resistivities, and surface concentrations could be reproduced. The experiments were designed to emphasize the contribution of the mass transfer and methods of measurement to the error, and to deemphasize the effect of source-to-source variations. In general, the 10 wt-pct source provided the more reproducible performance, allowing the placement of junctions to within ±1/3 microns, control of sheet resistivities to within roughly ±30 pct and control of surface concentrations to within a factor of 5 at the level of 3x10 to the 19th power atoms/cu cm. Diffusion coefficients and activation energies for the diffusion of boron in silicon calculated from the two sets of data were in acceptable agreement with the published values. (Author)

AD-618 203 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

California Univ., La Jolla.
SUPERCONDUCTIVITY IN ONE AND TWO DIMENSIONS.
Technical rept.,
by T. M. Rice. 13 Jul 65, 11p Rept. no. TR-32
Contract NONR221611; Grant AF AFOSR610 64,
Proj. NR017 630

Unclassified report

Descriptors: (*Superconductivity, Thermodynamics), Surface properties, Fermions, Statistical functions.

The effect of thermodynamic fluctuations on off diagonal long range order (ODLRO) is discussed. The two particle Yang correlation function is calculated using the Ginzburg-Landau theory allowing such fluctuations. The behavior of the correlation function at large separation is examined and it is found to be consistent with Yang's criterion for ODLRO only in three dimensions. In one and two dimensions Yang's criterion is not satisfied. (Author)

AD-618 204 Div. 9/1
CFSTI Prices: HC$1.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
ON THE PRESSURE LOSS OF TURBULENT FLOW THROUGH CURVED PIPES (REPORT 1),
by Hidesato Ito. Jun 65, 20p Rept. no. RSIC-425
TT 65-62653

Unclassified report

Trans. of Tohoku Daigaku Kosoku Rikigaku Kenkyujo Hokoku (Japan) v8 n76 p63-76 1952.

Descriptors: (*Turbulence, Pipes), (*Pressure, Pipes), Japan, Partial differential equations, Boundary layer, Reduction.

It is the intent of the investigation to approach the problem of pressure loss in curved pipes from a fresh theoretical outlook and clarify the patterns of water flow and head pressure attenuation. The report treats the case where the radius of curvature of the bend is considerably greater than the radius of curvature of the pipe. Attempts in the past to treat pressure loss in turbulent flow by a simple parameter involving various radii and Reynolds number apparently have not been successful. It is that such a parameter actually exists and can be represented. This parameter can be used to express the pressure loss of a turbulent flow through a curved pipe by a simple equation. (Author)

AD-618 211 Div. 8/6, 2/5
CFSTI Prices: HC$2.00 MF$0.50

Geoscience, Inc., Cambridge, Mass.
DEEP RESISTIVITY RESULTS FROM DC GROUND TESTS AT HOOVER DAM.
Scientific rept. for Jan-Feb 64,
by Howard S. Lahman and Keeva Vozoff. May 65, 35p
Rept. no. SR-6
Contract AF19 628 2351, Proj. 4600, Task 460008
AFCRL 65-404
Unclassified report

See also AD-612 609.

Descriptors: (*Resistance(Electrical), Lithosphere), (*Lithosphere, Resistance(Electrical)), Communication systems, Wave transmission, Electromagnetic waves, Earth, Rock(Geology), Earth models, Geophysics, Stratigraphy, Dipole antennas, Feasibility studies, California, Nevada, Arizona, Utah.

A deep crustal resistivity survey was conducted in the California, Nevada, Arizona and Utah area centered roughly about Las Vegas. The survey revealed that layered interpretation appears to be of value in the area. Regional and local geologic variations were also reflected in the results. The interpreted model of the electrical properties of this area is a three layer case. The upper layer has a low resistivity on the order of 10ghms-m, and varies in thickness from a few hundred meters in Southern California to 1 or 2 km to the northeast. The second layer is 26 to 30 km thick, increasing to the northeast. The resistivity of the second layer varies from about 3,000 ghms-m to 20,000 ghms-m, increasing to the southwest. The Mohorovicic discontinuity forms the base of the second layer, with the underlying upper mantle having a conductivity at least an order of magnitude greater than that of the second layer. Rugged topography in the area causes local variations in thickness of the conductive valley fill. This causes sufficient scatter in the data that definitive interpretation (at the long separations necessary) would be virtually impossible without other geophysical data. (Author)

AD-618 212 Div. 25/2, 25/6
CFSTI Prices: HC$2.00 MF$0.50

Honeywell Research Center, Hopkins, Minn.
OBSERVATIONS OF DISLOCATIONS IN CaWO4 BY TRANSMISSION ELECTRON MICROSCOPY.
Technical rept.,
by A. Arbel and R. J. Stokes. Jul 65, 32p
Rept. nos. TR-29, HR-65-267
Contract Nonr407600, Proj. NR032 451
Unclassified report

Descriptors: (*Crystal lattice defects, Electron microscopy), (*Electron microscopy, Crystal lattice defects), (*Calcium compounds, Tungstates), (*Tungstates, Crystal lattice defects), Foils, Photomicrography, Crystal structure, Deformation, Strain(Mechanics), Hardening, Models(Simulations).

The distribution of dislocations in deformed calcium tungstate was studied by electron transmission microscopy. The photomicrographs confirmed earlier optical observations that (001) <100> is the slip system of this material between 500 - 900C. Screw dislocations, long edge dislocation dipoles, quadrupoles and tangles of dislocations were observed in foils prepared from specimens deformed at 500C. Specimens deformed at 700C showed similar features, except that many of the long dipoles had split into long strings of prismatic loops. At 900C the loops were more isolated and sometimes grew to a diameter exceeding the thickness of the foil. Many single dislocations could also be seen with nearly pure edge or screw orientation. Two models are proposed for quadrupole formation and their relative stability considered. Strain hardening is thought to be due to the interaction of dislocations with multipoles and prismatic circular loops. (Author)

AD-618 215 Div. 25/6, 13/4, 15/1
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. School of Humanities and Sciences.
YIELD-POINT LOAD DETERMINATION BY NON-LINEAR PROGRAMMING.
Technical rept.,
by Phillip G. Hodge, Jr. 18 Jun 65, 29p
Rept. no. CS-25
Contract Nonr22537, Proj. NR044 211
Unclassified report

Descriptors: (*Loading(Mechanics), Plasticity), (*Nonlinear programming, Loading(Mechanics)), Structural parts, Elasticity, Boundary value problems, Beams(Structural).

The determination of the yield-point load of a perfectly plastic structure can be formulated as a nonlinear programming problem by means of the theorems of limit analysis. This formulation is discussed in general terms and then applied to the problem of a curved beam. Recent results in the theory of nonlinear programming are called upon to solve typical problems for straight and curved beams. The theory of limit analysis enables intermediate answers to be given a physical interpretation in terms of upper and lower bounds on the yield-point load. The paper closes with some indication of how the method may be generalized to more complex problems of plastic yield-point load determination. (Author)

AD-618 219 Div. 25/8, 9/1
CFSTI Prices: HC$2.00 MF$0.50

Fluid Mechanics Lab., Mass. Inst. of Tech., Cambridge.
EXPERIMENTAL STUDY OF HEAT CONDUCTION THROUGH RAREFIED GASES CONTAINED BETWEEN CONCENTRIC CYLINDERS,
by Alexander Dybbs and George S. Springer. Jun 65, 29p Pub-65-3
Contract Nonr184193
Unclassified report

Descriptors: (*Thermal conductivity, Helium group gases), (*Cylindrical bodies, Thermal conductivity), Thermodynamics, Helium, Argon, Neon, Filaments, Measurement, Vacuum.

Experiments were performed to measure heat conduction through rarefied gases at rest contained between two concentric cylinders. The test gases used were helium, neon and argon. The pressure was varied over a range that included free molecule, transition, and temperature jump conditions. The experimentally obtained heat conduction data were used to evaluate the results of the moment method proposed by Lees and Liu. Agreement between this method and the data was found to be within ±2.5% over the entire Knudsen number range covered in the experiments ($0.02 < Kn < 50$), assuming that the thermal accommodation coefficient at the inner cylinder remained constant over this range at its free molecule value. A comparison was also made between the data and the results of the temperature jump approximation, indicating that the heat conduction can be calculated by the temperature jump approximation within about 1% at Knudsen numbers less than approximately 0.02. (Author)

AD-618 220 Div. 25/8
CFSTI Prices: HC$2.00 MF$0.50

Fluid Mechanics Lab., Mass. Inst. of Tech., Cambridge.
TEMPERATURE DISCONTINUITIES AND ENERGY TRANSFER IN ONE-DIMENSIONAL RADIATION PROBLEMS,
by Yuan-siang Pan. Jun 65, 32p Pub-65-4
Contract Nonr184193

Unclassified report

Descriptors: (*Gases, Heat transfer), (*Heat transfer, Gases), Emissivity, Blackbody radiation, Energy, Thermal radiation, Transport properties, Optics, Surface temperatures, Thermodynamics.

A formulation for the temperature (or emissive power) distribution and radiative energy flux is given for a radiating grey gas layer bounded by two parallel black surfaces. The gas temperatures at the surfaces are solved exactly by using the Laplace transform. The temperature of the gas at the surface is, in general, not equal to the surface temperature. The temperature discontinuity is made up of the sum of two terms, an exponential of the optical thickness of the gas layer and an integral of an exponential of the optical thickness. An analytic solution for the energy flux is obtained by assuming an approximate temperature (or emissive power) distribution function. Results for the temperature (or emissive power) discontinuities and energy flux are presented as a function of the gas layer optical thickness. Comparisons with numerical results and other approximate calculations are made. (Author)

AD-618 223 Div. 25/2, 25/3
CFSTI Prices: HC$2.00 MF$0.50

New Mexico State Univ., University Park. Research Center.
EFFECTIVE POLARIZING FIELD IN IONIC CRYSTALS.
Semi-Annual technical rept. no. 1,
by O. Theimer and R. Paul. Jun 65, 29p
Contract Nonr353102 Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Crystals, Ions), (*Field theory, Crystals), Polarization, Electric fields, Atomic charge, Refractive index, Valence, Quantum mechanics, Crystal lattices.

The polarizing field E in ionic crystals is calculated from a 'rigid ion' model in which the spherical charge cloud of the valence electrons is displaced rigidly against the ionic core under the influence of an electrical field. It is shown that overlap between neighboring charge clouds affects the Lorentz field, (4pi/3)Pg, (P = microscopic polarization) in such a fashion that the Lorentz factor g becomes equal to 1 + delta even in crystals with tetrahedral symmetry where it is generally assumed equal to unity. The overlap correction delta is calculated on the assumption that the wave functions of the valence electrons may be approximated by Slater functions, i. e., hydrogen-like wave functions with effective, non-integral atomic numbers Z*, and quantum number n*. Using Slater's empirical values for Z* and n*, delta is found of the order 0.1 for crystals with large anions and small cations such as sodium bromide and lithium iodide. For most other crystals delta is found of the order 0.01. (Author)

AD-618 236 Div. 25/1

Rensselaer Polytechnic Inst., Troy, N. Y.
ANALYSIS OF SURFACE-REFLECTED/BOTTOM-REFLECTED RAY TRANSMISSIONS IN CONSTANT-VELOCITY-GRADIENT MEDIA,
by Melvin J. Jacobson. 4 Dec 64, 10p
RPI MATHREPT-69
Contract Nonr59109

Unclassified report

Pub. in Acoustical Society of America. Journal v37 n5 p885-93 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Underwater sound, Sound transmission), (*Sound transmission, Underwater sound), (*Acoustics, Underwater sound), Sound, Refraction, Reflection, Ocean bottom, Surface area, Mathematical models.

This paper complements an earlier study of refracted/bottom-reflected rays by the author and considers surface-reflected/bottom-reflected transmissions in a model ocean having a horizontal surface and bottom and sound velocity that decreases linearly with depth. The case of increasing velocity is implicit since transmissions in media with velocity gradients +g and -g are geometrically equivalent. The paper is concerned primarily with an analysis of spreading loss. General expressions are derived for spreading loss, range, and travel time, and the problem of multiple arrivals at a fixed receiving point is examined. The spreading loss along a ray is considered in detail after the ray has experienced many reflections. Detailed results are presented for the case of a bottomed source and receiving point, and these are compared with the corresponding results for refracted/bottom-reflected transmissions. (Author)

AD-618 244 Div. 25/2, 4/3

Air Force Cambridge Research Labs., Bedford, Mass.
STRUCTURE OF 9,9,10,10-TETRACHLORO-ANTHRACENE.
Physical Sciences Research papers,
by N. F. Yannoni, A. P. Krukonis, and J. Silverman.
Jun 65, 10p Rept. nos. AFCRL-65-376, PSRP-107
Proj. 8659, Task 865901

Unclassified report

Pub. in Science v148 n3667 p231-2 Apr 9 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Halogenated hydrocarbons, Crystal structure), (*Polycyclic compounds, Crystal structure), (*Crystal structure, Polycyclic compounds), Chlorine compounds, X-ray diffraction analysis, Molecular structure, Chemical bonds, Stereochemistry.

The crystal structure of 9,9,10,10-tetrachloroanthracene was determined by x-ray analysis. The structure is characterized by dovetailed packing of crystallographically independent molecules. The anthracene skeletons are planar, and the molecules have approximately D2h symmetry. Bond distances and angles are summarized and the stereochemical implications of the results are discussed. (Author)

AD-618 245 Div. 25/6

Air Force Cambridge Research Labs., Bedford, Mass.
ULTRAPURIFICATION, ITS ATTAINMENT AND ANALYSIS.
Special rept.,
by A. F. Armington, B. Rubin, and J. Paul Call.
1964, 21p Rept. nos. AFCRL-65-383; SP-24
Proj. 5620, Tasks 562003, 562004

Unclassified report

Pub. in Annals of the New York Academy of Sciences v118 art16 p613-44 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Purification, Materials), Semiconductors, Solid state physics, Chemical analysis, Analysis, Impurities.

Contents: Standard purification techniques; The need for ultrapurity; Analytical methods for the control of chemical purity.

AD-618 248 Div. 25/1, 30/5

National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
COMPARISON OF REVERBERATION-ROOM AND IMPEDANCE-TUBE ABSORPTION MEASUREMENTS.
Research paper,
by D. Olynyk and T. D. Northwood. 9 Jun 64, 7p
Rept. no. NRC-8398 RP-240
Unclassified report

Pub. in Acoustical Society of America. Journal v36 n11 p2171-4 Nov 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Acoustic insulation, Test methods), Materials, Acoustic properties, Sound, Absorption, Measurement, Acoustic impedance, Vibration, Extremely low frequency, Audiofrequency, Acoustics.

Reverberation-room absorption measurements on some 50 samples of commercial acoustical materials were compared with values predicted from impedance-tube measurements on the same materials. The predictions involved calculating the random-incidence absorption for the standard 9X8-ft patch of material. At frequencies of 125, 250, 500, 1000, and 2000 cps, various degrees of correlation were found between impedance-tube data and reverberation-room results involving mountings 1, 2, and 4 (adhesive, furring strips, and rigid backing, respectively). Of special interest were results at 250 cps in which the absorption was sensitive to type of mounting. For mountings that permitted diaphragm vibration of the material, the reverberation-room results were substantially higher than predicted values based on rigidly backed samples. Remnants of this behavior appeared at 500 cps for the thin materials, but otherwise correlation was good at this and higher frequencies. Highly absorptive materials correlated better than those with low absorption, for which reverberation-room results still tended to be somewhat higher than was predicted. (Author)

AD-618 250 Div. 25/8, 4/4, 7/1

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
THERMAL DIFFUSION MEASUREMENTS BY WAVE-FRONT-SHEARING INTERFEROMETRY,
by Silas E. Gustafsson, Julius G. Becsey, and James A. Bierlein. 28 Oct 64, 8p
Rept. no. ARL-65-146
Unclassified report

Pub. in Journal of Physical Chemistry v69 n3 p1016-21 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electrolytes, Thermal diffusion), (*Thermal diffusion, Optical analysis), (*Interferometers, Thermal diffusion), Mechanical waves, Electrolytic cells, Heat transfer, Density.

The application of wave-front-shearing interferometry to the study of thermal diffusion is analyzed mathematically, and it is shown that an optimum shear exists which maximizes the sensitivity of the method. Experimental measurements on electrolyte solutions, using a form of interferometer described by Bryngdahl, give results which are comparable in precision to the best previous determinations made by other techniques. The present method has worthwhile advantages of simplicity and convenience. (Author)

AD-618 251 Div. 9/1

Rensselaer Polytechnic Inst., Troy, N. Y.
EXPERIMENTAL STUDY OF NONEQUILIBRIUM EXPANDING FLOWS,
by Robert E. Duffy. 23 Sep 64, 11p
Contract AF33 616 7312
ARL 65-148
Unclassified report

Pub. in A I A A Journal v3 n2 p237-44 Feb 1965 (Copies not available to DDC or Clearinghouse customers) Presented as Preprint 64-39 at the AIAA Aerospace Sciences Meeting, New York, January 20-22, 1963.

Descriptors: (*Nonequilibrium flow, Kinetic theory), (*Kinetic theory, Nonequilibrium flow), Gas flow, Conical nozzles, Shock tubes, Statics, Pressure gages, Air, Nitrogen, Oxygen, Fluid mechanics, Mathematical models.

An experimental study of nonequilibrium expanding flows has been carried out by measuring the static pressure at several axial locations in a 30 degree included angle conical nozzle attached to the reflected end of a combustion driven shock tube. In the axial survey, measurements were made at locations corresponding to geometric area ratios of from 36 to 576. Reservoir stagnation conditions were: 1000 psia, 1350 K; 450 psia, 4000 K; and 250 psia, 7000 K. The test gases used in this study were dry room air, extra-dry analyzed air, and a high-purity mixture of 80% nitrogen and 20% oxygen. The data reduction procedures that have been employed in this study are discussed. The methods for treating effects due to boundary-layer growth both on the nozzle walls and on the static-pressure probe, static-pressure probe size, flow gradients in the nozzle, etc., are outlined. It has been found that corrections for these effects are necessary to interpret properly static-pressure data. The apparent disagreement between previous experimental investigations and theoretical analyses is traceable in a large measure to these corrections. The measurements are compared with results obtained using a one-dimensional analysis that incorporates a gas kinetic model based on the best available chemical data. It is shown that the experimental data are in good agreement with the theoretical results. (Author)

AD-618 257 Div. 25/3, 14/2, 30/2

Suffield Experimental Station, Ralston (Alberta).
ON CHARGE RELEASE IN FERROELECTRIC CERAMICS,
by J. D. Muirhead. 11 Sep 64, 1p
Proj. DRB D89 16 01 12
Unclassified report

Pub. in Institute of Electrical and Electronics Engineers. Proceedings v53 n3 p327-8 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electric discharges, Ferroelectric materials), (*Ceramic materials, Ferroelectric materials), Computer logic.

AD-618 277 Div. 25/2, 25/6

Army Electronics Labs., Fort Monmouth, N. J.
NEW Mn-SUBSTITUTED HEXAGONAL FERRITES,
by J. A. Kohn and D. W. Eckart. 1965, 3p
Unclassified report

Pub. in Journal of Applied Physics v36 n3 pt2 p1171-2 Mar 1065 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ferromagnetic materials, Manganese compounds), (*Ferrites, Crystal structure), (*Manganese compounds, Ferrites), Single crystals, X-ray diffraction analysis, Phase studies, Barium compounds, Zinc compounds, Solid solutions.

Seven new hexagonal ferrite structures were identified by single-crystal x-ray diffraction during a study of crystals from Mn-substituted Y phase syntheses. They fall in the M2Yn series and are comprised of a c-axis stacking of 2 five-anion-layer M blocks permuted with 9-13 six-anion-layer Y blocks. The series is thereby extended to larger unit cells and the total number of known hexagonal ferrites raised to 31. Three of the new structures are hexagonal, four are rhombohedral; in polytypic nomenclature they are 192Rc, 70Hb, 228Ra, 76Ha, 76Hb, 228Rd, and 264Re. The latter has a c-axis repeat period of 264 anion layers; a = 5.88 A (common to all hexagonal ferrites), c=636.7 A. Weissenberg x-ray patterns and 00.1 diffraction tometer traces established symmetry and identity layering. Stacking models were confirmed by 00.1 structure-factor computations. (Author)

AD-618 282 Div. 20/2

Palmer Physical Lab., Princeton Univ., N. J.
THE VACUUM TRAJECTORY IN CONVENTIONAL FIELD THEORY,
by M. Gell-Mann, M. L. Goldberger, and F. E. Low.
1964, 11p
Contract AF49 638 1333, Proj. 9751, Task 975102
AFOSR 65-1062

Unclassified report

Pub. in Reviews of Modern Physics v36 n2 p640-9 Apr 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Particle trajectories, Vacuum), (*Field theory, Particle trajectories), Fermions, Potential theory, Perturbation theory, Nuclear spins, Bosons.

The generation of a Pomeranchuk-like (or P) trajectory in the conventional field theory is discussed. This differs from the previously discussed fermion trajectory problem in several ways. The P trajectory in no way corresponds to an elementary particle of field theory but is more analogous to the well understood trajectories of potential theory (or ladder approximations in field theory) with the difference that it approaches J = 1 as gamma squared approaches 0 rather than J = -1 as in potential theory. This is due to the spin of the particles involved.

AD-618 283 Div. 25/7

University of Western Ontario, London. Dept. of Physics.
THE ELECTRONIC TRANSITION MOMENT OF THE A2Σ-X2Σ SYSTEM OF A10,
by D. C. Tyte and G. R. Hebert. 31 Aug 64, 3p
Grant AF AFOSR62 236, Proj. 9768, Task 976801
AFOSR 65-1090

Unclassified report

Pub. in Proceedings of the Physical Society v84 pt5 n541 p830-2 1964 (Copies available only to DDC users).

Descriptors: (*Electron transitions, Moments), (*Aluminum compounds, Oxides), Excitation, Intensity, Band spectrum, Shock tubes, Molecular spectroscopy.

Photographic intensity measurements have been made on the A2Σ-X2Σ system of A10 excited in a shock tube and by exploding an Al foil. The electronic transition moment was found to have the form R(r) = const (1-0.46r). This result confirms that previously reported by Hebert and Tyte for the system excited in an a. c. arc. (Author)

AD-618 284 Div. 25/7

University of Western Ontario, London. Dept. of Physics.
INTENSITY MEASUREMENTS ON THE A2Σ-X2Σ SYSTEM OF ALUMINUM OXIDE.
Revised ed.,
by G. R. Hebert and D. C. Tyte. 24 Dec 63, 7p
Contract AF19 628 2820; Grant AF AFOSR62 236, Proj. 9768, Task 976801
AFOSR 65-1091

Unclassified report

Pub. in Proceedings of the Physical Society v83 p629-34 1964 (Copies available only to DDC users).

Descriptors: (*Band spectrum, Intensity), (*Aluminum compounds, Oxides), (*Electron transitions, Moments), Excitation, Electric arcs.

Relative integrated band intensities of 29 bands of the blue-green system of aluminum oxide, excited in a low pressure arc, have been measured by photographic photometry. The electronic transition moment was found to have the form R(r) = const. (1-0.46 r); 1.50 A < r < 1.85A. Smoothed relative transition probabilities have been derived for the bands. (Author)

AD-618 285 Div. 25/7

University of Western Ontario, London. Dept. of Physics.
ON THE RELATIONSHIP BETWEEN R CENTROID AND BAND FREQUENCY,
by R. W. Nicholls. 1965, 5p
Contract AF19 628 2820; Grant AF AFOSR62 236, Proj. 9768, Task 976801
AFOSR 65-1092

Unclassified report

Pub. in Proceedings of the Physical Society v85 p159-62 1965. (Copies available only to DDC users).

Descriptors: (*Band spectrum, Frequency), (*Center of mass, Molecules), Molecular spectroscopy, Molecular structure, Potential theory, Integrals.

The monotonic relationship between r centroid and band frequency has been investigated in detail, and the circumstances which cause r centroids to increase or decrease with increasing frequency are discussed. Except in cases where change in molecular properties with internuclear separation is of specific interest, band frequency (or wavelength) may thus often be more conveniently used as an alternative to the r centroid as an independent variable in the discussion of the change of such molecular properties as transition probabilities from band to band in a system. (Author)

AD-618 287 Div. 25/1, 4/4

California Inst. of Tech., Pasadena. Div. of Chemistry and Chemical Engineering.
ABSORPTION OF SOUND IN CRITICAL MIXTURES,
by C. J. Pings and A. V. Anantaraman. 1 Apr 65, 2p
Contracts AF49 638 1273, Nonr22040

Unclassified report

Pub. in Physical Review Letters v14 n19 p781-2

May 10 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sound, Absorption), (*Mixtures, Acoustic properties), Nitrobenzenes, Aliphatic compounds, Solutions, Temperature, Frequency.

The paper is concerned with the results of an experimental study of the absorption of sound at the critical composition of a mixture (0.52 mole fraction nitrobenzene in iso-octane), and its interpretation in terms of the Fixman theory. The data obtained lend substantial credence to the functional dependence of sound absorption upon temperature and frequency predicted by Fixman.

AD-618 288 Div. 20/2

Institute of Theoretical Physics, Stanford Univ., Calif.
HYPERON PRODUCTION BY NEUTRINOS IN AN SU3 MODEL,
by N. Cabibbo and Frank Chilton. 5 Nov 64, 7p
Contract AF49 638 1389, Proj. 9751, Task 975101
AFOSR 65-1065

Unclassified report

Pub. in Physical Review v137 n6B pB1628-34 Mar 22 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hyperons, Production), (*Neutrinos, Nuclear reactions), Nuclear models, Differential cross section, Quantum mechanics, Nuclear particles.

An SU3 model of weak interactions is used to discuss amplitudes and cross sections for hyperon production by neutrinos. Numerical results for the cross sections are given. The notion of first- and second-class currents is extended to currents transforming like multiplets under SU3. (Author)

AD-618 296 Div. 25/3, 9/1
CFSTI Prices: HC$1.00 MF$0.50

Strathclyde Univ., Glasgow (Scotland). Dept. of Mathematics.
RESEARCH ON MAGNETO-GASDYNAMICS.
Final scientific rept.,
by D. C. Pack. 15 Feb 65, 7p
Grant AF EOAR6 64
AFOSR 65-1069

Unclassified report

Descriptors: (*Magnetohydrodynamics, Gas flow), One-dimensional flow, Dielectrics, Wedges, Shock waves, Deflagration, Detonations, Flames, Great Britain.

An analysis was made of the rectilinear, adiabatic but non-isentropic, unsteady flow of a perfectly conducting ideal gas moving in the presence of a transverse magnetic field. Detailed properties of certain generalized simple waves were obtained. The upstream influence effects in the flow of a perfectly conducting fluid over an insulating wall were found on the basis of linearized theory. The question of the physical realization of the solutions found by Cabannes for flow of perfectly conducting gas past a wedge in a magnetic field aligned with the stream was examined by a combination of analytical and heuristic arguments. Magneto-gasdynamic deflagrations under the Chapman-Jouguet condition were studied and work has been initiated on similarity solutions for cylindrical magnetogasdynamic detonations and flames. (Author)

AD-618 297 Div. 25/4, 8/2
CFSTI Prices: HC$2.00 MF$0.50

Northeastern Univ., Boston, Mass.
RESEARCH ON STORAGE DIODE LASERS.
Final technical summary rept. for 1 Apr 63-15 May 64,
by Richard G. Seed and Karl M. Hergenrother.
15 May 64, 50p
Contract Nonr410602, ARPA Order 306 62

Unclassified report

Descriptors: (*Lasers, Diodes(Semiconductor)), (*Diodes(Semiconductor), Lasers), Circuits, Design, Effectiveness, Configuration, Cryogenics, Range finding, Light communication systems, Light pulses, Gallium compounds, Arsenides, Germanium, Silicon.

Research on a proposed storage diode laser is described. The objectives are (1) completion of design theory (2) basic parameter measurements (3) experimental proof (4) fabrication of effective devices. The desirability of such a device in many potential applications is discussed. The design theory is presented in detail. Four possible storage diode laser configurations are described, of which the most promising involves a low current storage pulse and high current trigger pulse in a long lifetime material. The possibility of obtaining long lifetime by the shift from direct to indirect transition is discussed. Negative experimental results with extreme high current pulses in germanium and silicon are presented. Reverse emission of gallium arsenide and the shift of the absorption edge in germanium are described. The design of diode laser pulsers is reviewed in general. Three specific circuit configurations are presented. An electrical double pulser is described. The technology of image converters and coolers used is described. (Author)

AD-618 299 Div. 25/3, 9/1
CFSTI Prices: HC$2.00 MF$0.50

Fluid Mechanics Lab., Mass. Inst. of Tech., Cambridge.
EXPERIMENTAL MEASUREMENT OF THE GROWTH OF A TURBULENT MERCURY JET IN A COAXIAL MAGNETIC FIELD,
by Miklos Sajben and James A. Fay. Jun 65, 36p
Pub-65-5
Contracts AF19 628 221, Nonr3623S2

Unclassified report

Descriptors: (*Magnetohydrodynamics, Mercury), (*Mercury, Jets), Turbulence, Magnetic fields, Stability, Reynolds number, Velocity, Damping.

Using a hot wire system developed for this purpose, measurements of the velocity were made in a circular liquid mercury jet issuing into a low speed secondary flow and subject to a uniform axial magnetic field. The Reynolds number of the jet was about 10,000 while the magnetic interaction parameter varied from zero to slightly over one. The jet was strongly turbulent under all conditions investigated. The radial distribution of the mean and fluctuating component of the meridional velocity was measured at four axial stations located between 2 and 34 diameters from the nozzle exit. The results indicate that the rate of spreading of the jet is decreased, that the shape of the velocity profile changes and that the turbulent intensity decreases with increasing magnetic field strength. The high frequency components of the fluctuations in the secondary flow seem to be damped more strongly than fluctuations at low frequencies, while the reverse is observed within the core of the jet. (Author)

AD-618 310 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
CREEP ANALYSIS OF CIRCULAR PLATES BY ENERGY METHODS.
Scientific rept.,
by James Bentson, Sharad A. Patel, and B. Venkatraman.
Mar 65, 18p Rept. no. PIBAL-698
Contract AF49 638 1360, Proj. 9782, Task 978201
AFOSR 65-0985

Unclassified report

Descriptors: (*Creep, Metal plates), (*Metal plates, Creep), Elasticity, Differential equations, Boundary value problems, Energy, Calculus of variations, Potential theory.

The paper investigates the creep bending of circular plates using energy theorems of elasticity. Firstly, the theorem of minimum potential energy is used to derive, in terms of rectangular coordinates, the governing differential equations and the natural boundary condition for laterally loaded thin plates. Next, these equations are transformed into polar coordinates for application to rotationally symmetric circular plate problems. For such plates, the theorem of minimum total complementary potential is then used to derive the governing moment equation and the corresponding boundary conditions. This is followed by a brief discussion of Reissner's variational theorem as applied to circular plates problems. The use of each of these three theorems is then illustrated by obtaining solutions to the problem of a simply supported circular plate. Finally, these solutions are graphically compared with exact solutions obtained previously. (Author)

AD-618 314 Div. 25/3, 9/1, 9/2
CFSTI Prices: HC$7.00 MF$1.75

Foreign Technology Div., Wright-Patterson AFB, Ohio.
JOURNAL OF APPLIED MECHANICS AND TECHNICAL PHYSICS, 1963, NO. 6: COLLECTION OF ARTICLES.
9 Apr 65, 338p Rept. no. FTD-MT-64-66
TT 65-62657

Unclassified report

Edited machine trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n6 p1-192 1963.

Descriptors: (*Magnetohydrodynamics, Fluid flow), (*Fluid mechanics, Scientific research), Shock waves, Magnetic fields, Explosion effects, Plasma physics, Turbulence, Detonations, Combustion, Thermodynamics, USSR.

Articles are presented on magnetohydrodynamics, fluid flow, and explosions.

AD-618 315 Div. 25/4, 15/1
CFSTI Prices: HC$2.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
APPLICATION OF PROBABILITY METHOD FOR CALCULATION OF OPTICAL CHARACTERISTICS OF QUANTUM GENERATORS OF LIGHT,
by B. I. Stepanov and V. P. Gribkovskii.
26 May 65, 42p Rept. no. FTD-MT-64-324
TT 65-62658

Unclassified report

Edited machine trans. of Uspekhi Fizicheskikh Nauk (USSR) v82 n2 p201-20 1964.

Descriptors: (*Light, Electron transitions), (*Probability, Electron transitions), (*Optical properties, Quantum mechanics), Atomic energy levels, Pumping(Electronics), Population(Mathematics), USSR.

On the basis of the probability method and the resonator theory, it is possible to explain the basic properties of quantum generators of light and in a number of the most important cases to obtain quite accurate correlation with experiment. During use of probability method of calculation, energy levels and probability of transition between them are used as initial data. The main problem is reduced to determination of populations of separate levels depending upon intensity of irradiation, with subsequent calculation of number of optical transitions. In quantum generators it is necessary to consider transitions between levels which appear under the action of pumping radiation, as well as under action of the generated radiation itself.

AD-618 317 Div. 25/6, 13/4
CFSTI Prices: HC$3.00 MF$0.75

Foreign Technology Div., Wright-Patterson AFB, Ohio.
ANALYSES OF DESIGN ELEMENTS UNDER DYNAMIC LOADS (SECTION IV),
by V. V. Bolotin. 20 May 65, 75p
Rept. no. FTD-MT-64-522
TT 65-62660

Unclassified report

Edited machine trans. of Raschety na Prochnost'. Teoreticheskie i Eksperimental'nye Issledovaniya Prochnosti Mashinostroitel'nykh Konstruktsii. Sbornik Statei (USSR) n10 p211-60 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Loading(Mechanics), Structural parts), (*Dynamics, Design), Dynamics, Statics, Correlation techniques, Elasticity, Theory, Probability, Reliability, Analysis, Statistical mechanics.

Contents: Analyses of design elements under dynamic loads: Survey of investigations on the statistical dynamics of elastic systems; quasi-static methods, correlation methods, methods of kinetic equations, and comparison of methods, trends of future investigations.

AD-618 318 Div. 25/2, 26/1, 17/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
APPLICATION OF STATISTICAL THEORY OF DISLOCATIONS TO DERIVATION OF BASIC RELATIONSHIPS FOR STRENGTHENING CURVES,
by N. S. Akulov and A. K. Shukevich. 14 Jul 65, 8p
Rept. no. FTD-TT-65-346
TT 65-62661

Unclassified report

Unedited rough draft trans. of Akademiya Navuk BSSR, Minsk. Doklady, v7 n7 n453-5 1963.

Descriptors: (*Crystal lattice defects, Deformation), (*Deformation, Crystal lattice defects), (*Metallurgy, Deformation), Metals, Hardening, Statistical analysis, Theory, Dispersion hardening.

AD-618 319 Div. 9/1, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.

PNEUMONICS,
by Yu. Popov, Yu. Pukhnachev, A. S. Pushkin, M. Isakovskii, and B. Pasternak. 19 Jul 65, 21p
Rept. no. FTD-TT-65-742
TT 65-62662

Unclassified report

Unedited rough draft trans. of Nauka i Zhizn (USSR) v32 n1 p10-8 1965.

Descriptors: (*Fluid flow, Control systems), (*Control systems, Fluid flow), Amplifiers, Nozzles, Feedback, Oscillation.

AD-618 323 Div. 25/3, 9/1
CFSTI Prices: HC$2.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
FULLY DEVELOPED TURBULENT SUPERSONIC FLOW IN RECTANGULAR CHANNELS.
Flight sciences laboratory rept.,
by J. Kenneth Richmond and Raymond Goldstein.
May 65, 49p Rept. nos. FSL-98, D1-82-0441

Unclassified report

Also available from the author.

Descriptors: (*Rectangular bodies, Supersonic characteristics), (*Supersonic flow, Turbulence), (*Magnetohydrodynamics, Supersonic flow), Friction, Particle accelerators, Turbulent boundary layer, Heat transfer, Argon, Stagnation point, Pressure, Reynolds number, One-dimensional flow.

In order to assess properly the gas dynamic aspects of MHD channel flow it is necessary to obtain details of the flow conditions before fields are applied. In a channel with an entrance cross section of one cm square, with lengths up to 20 cm, at a Mach number of about 1.5 and at static pressures approaching one atm, a turbulent boundary layer fills the channel, and fully developed pipe flow turbulence prevails. A simple one-dimensional theory is presented for this case, relating stagnation pressure change to area change, heat transfer and friction factor. Experiments are described in which a supersonic flow of heated or cold argon was passed into the channel, and the flow rate and temperature varied to cover a range of Reynolds numbers (based on channel width) from 5,000 to 500,000. Total pressure and total temperature changes are correlated with the theory to indicate the progress of boundary layer development and the parameters affecting the friction and heat transfer coefficients. (Author)

AD-618 326 Div. 25/3, 9/1
CFSTI Prices: HC$3.00 MF$0.75

Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
STATISTICAL THEORY OF HOMOGENEOUS HYDROMAGNETIC TURBULENCE,
by Sayed D. Hassan. Jun 65, 99p
Rept. no. SUDAER-238
Grant DA AROD31 124G457
AROD 4284:4

Unclassified report

Descriptors: (*Turbulence, Magnetohydrodynamics), (*Magnetohydrodynamics, Turbulence), (*Statistical analysis, Magnetohydrodynamics), Fourier analysis, Magnetic fields, Kinetic theory, Axially symmetric flow, Vortices, Stochastic processes.

The existence of equilibrium ranges in homogeneous hydromagnetic turbulence is analyzed by using Fourier techniques. It is found that the reasons for believing in the existence of the equilibrium range in classical turbulence (non-conducting fluid) also hold for hydromagnetic turbulence. The presence of an external magnetic field has the effect of rendering the turbulence field axisymmetric about those magnetic lines. The second problem considered is the asymptotic form of different correlation tensors at large separation distance in homogeneous hydromagnetic turbulence. The third problem considered is a theory of weak turbulence where one can neglect the role of pressure forces in developing power laws. Lastly, is considered the final period of decay. (Author)

AD-618 330 Div. 8/6
CFSTI Prices: HC$6.00 MF$1.50

Stanford Research Inst., Menlo Park, Calif.
HF TIME-AND FREQUENCY-DISPERSION EFFECTS--EXPERIMENTAL VALIDATION OF AN FSK ERROR-RATE MODEL.
Technical rept.,
by B. M. Sifford, H. N. Shaver, R. F. Daly, and K. D. Felperin. Mar 65, 245p Rept. no. TR-4
Contract DA36 039SC90859

Unclassified report

Descriptors: (*Radio communication systems, Performance(Engineering), Errors, Sensitivity, High frequency, Attenuation, Propagation, Mathematical models, Measurement, Doppler effect, Radio transmission, Transmitter-receivers, Probability, Data transmission systems.

An experiment has been conducted to determine the sensitivity of an HF FSK communications system to time- and frequency-selective fading phenomena. Binary error rate was measured on AN/FGC-29 teletype terminal equipment over an HF path from Fort Monmouth, New Jersey to Palo Alto, California in the fall of 1964. Simultaneous measurements were made of channel signal-to-noise ratios, channel time-delay profiles, channel Doppler-shift profiles, and signal correlation between spaced antennas. Instrumentation included a phase-stable transmitter-receiver, an oblique-incidence ionospheric sounder, and a special correlation meter. The measured error rates were compared to those predicted by a mathematical model. The model for the channel considers randomly time-varying and frequency-selective effects appropriate for the HF propagation mechanism. The system model approximates the AN/FGC-29 system. Theoretical and measured error-rate curves are presented and discussed. Measured system performance showed a well-defined sensitivity to channel time- and frequency-selective effects. The asymptotic error rates measured at high signal-to-noise ratios are in reasonable agreement with those predicted from the model. (Author)

AD-618 336 Div. 8/6, 2/5
CFSTI Prices: HC$2.00 MF$0.50

Kiruna Geophysical Observatory (Sweden).
MICROPULSATION MEASUREMENTS ON THE GROUND SURFACE.
Scientific rept. no. 3.,
by S. Westerlund. Mar 65, 41p Rept. no. SR--3
Contract AF61 052 619
AFCRL 65-388

Unclassified report

Descriptors: (*Electromagnetic waves, Geophysics), (*Geophysics, Electromagnetic waves), Extremely low frequency, Propagation, Electromagnetic wave reflection, Ionosphere, Surface properties, Mathematical analysis, Electromagnetism, Earth.

Theory and literature concerning the behaviour of electromagnetic waves near the ground surface are reviewed. Special attention is paid to micropulsation frequencies. (Author)

AD-618 337 Div. 20/1, 25/7

General Atomic Div., General Dynamics Corp., San Diego, Calif.
LYMAN-ALPHA PRODUCTION IN H(+)-H(1s) COLLISIONS,
by R. F. Stebbings, R. A. Young, C. L. Oxley, and H. Ehrhardt. 14 Dec 64, 5p
Contract Nonr278600
Unclassified report

Pub. in Physical Review v138 n5A pA1312-6 May 31 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Proton bombardment, Hydrogen), (*Excitation, Hydrogen), Ultraviolet radiation, Electron capture, Ions, Inelastic scattering.

Lyman-alpha production in collisions between protons and hydrogen atoms has been measured in a crossed beam experiment, within the energy range 600 eV to 30 keV. The Lyman-alpha photons result both from excitation of thermal target atoms-H(+)+H(1s) to H(+)+H(2p)-and from electron capture into excited states of the projectiles-H(+)+H(1s) to H(2p)+H(+). These two processes are experimentally distinguishable in terms of the Doppler shift in the capture radiation. Measurements of the angular distribution of the Lyman-alpha photons, made with an oxygen-filtered iodine-filled counter, enable the signals from the two processes to be separately determined. Relative cross sections so obtained are normalized with the aid of earlier measurements of Lyman-alpha production in e(-)-H(1s) collisions. The results are discussed in the light of recent theoretical developments. (Author)

AD-618 338 Div. 25/1, 4/4

California Inst. of Tech., Pasadena.
COMMENT ON ABSORPTION AND DISPERSION OF SOUND IN CRITICAL MIXTURES,
by A. P. Kendig, R. H. Bigelow, P. D. Edmonds, and C. J. Pings. 23 Sep 63, 1p
Unclassified report

Pub. in Journal of Chemical Physics v40 n5 p1451 Mar 1 1964 (Copies not available to DDC or Clearinghouse customers).
Supported by AFOSR and ONR.

Descriptors: (*Sound, Absorption), (*Mixtures, Acoustic properties), Scattering, Integral equations.

A misprint in an equation in a paper by M. Fixman (J. Chem. Phys. 36:1961, 1962), concerning the absorption and dispersion of sound in liquid mixtures, is corrected and the resulting expression is evaluated.

AD-618 342 Div. 20/2, 20/3

Indiana Univ., Bloomington.
ENERGY DEPENDENCE OF ELASTIC AND INELASTIC SCATTERING OF ALPHA PARTICLES BY C12 AND THE C12 (alpha,p)N15 REACTION. LEVEL SCHEME OF I129. PRECISE SHAPE MEASUREMENTS OF BETA SPECTRA OF Y90 AND Y91. LEVELS OF Nd146 FROM THE DECAY OF Pr146.
Technical rept.,
by R. A. Atneosen, H. L. Wilson, L. M. Langer, A. V. Ramayya and Y. Yoshizawa. Aug 65, 34p
Rept. no. TR-17
Contract Nonr170502, Proj. NR024 006
Unclassified report

Pub. in Physical Review v135/137 n1B/3B pB13-6, 581-6, 660-8 Aug 10 1964-Jan 11 1965; Nuclear Physics v56 p129-39 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Alpha particle reactions, Carbon), (*Decay schemes, Iodine), (*Beta-ray spectrum, Yttrium), (*Nuclear energy levels, Neodymium), Elastic scattering, Inelastic scattering, Excitation, Nuclear models, Gamma-ray spectra, Tellurium, Beta decay, Radioactive isotopes, Praseodymium.

Angular distributions of alpha groups corresponding to elastic scattering and inelastic excitation of C12 to 4.43 MeV and of the proton group leading to the ground state of N15 were measured at eight energies between 20 and 23 MeV. The decay of 33d Te 129m was studied by means of beta-gamma and gamma-gamma coincidence and sum peak techniques. Precise measurements of the beta spectra details of Y91 and Y90 were made to determine the adequacy of the theory of beta decay in describing the observed distributions for the unique delta I = 2, parity changing transitions. A 24 minute radioisotope of Pr146 was produced by the Nd146 (n,p) Pr146 reaction.

AD-618 343 Div. 25/8, 9/1

Firestone Flight Sciences Lab., Calif. Inst. of Tech., Pasadena.
KINETIC THEORY DESCRIPTION OF RAREFIED GAS FLOW,
by Lester Lees. 19 Jun 64, 35p Pub-606
Contract DA31 124ARO D33
Unclassified report

Pub. in Journal of Soc. Indust. Appl. Math. v13 n1 p278-311 Mar 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Kinetic theory, Gas flow), (*Thermal conductivity, Gas flow), (*Heating, Flat plate models), Statistical functions, Partial differential equations, Transport properties, Heat transfer, Spheres, Cylindrical bodies, Vacuum, Boundary layer, Thermodynamics.

In an early paper with H. Bolza and Max Born, von Karman examined the relation between the 'collision-dominated' and 'collision-free' regimes in the simple case of steady flow or steady heat conduction through a porous medium. Von Karman also formulated the boundary condition at a gas-solid interface, and showed that the temperature 'jump' arises quite naturally from the two-sidedness of the velocity distribution function, independently of any statements about the thermal accommodation coefficient. An examination is made of this question of the transition between gas-kinetics and gasdynamics with the aid of the Maxwell moment method, utilizing a two-sided Maxwellian-type distribution as weighting function. The main features deduced from this approach are illustrated by considering two simple examples: (1) steady heat conduction between two concentric cylinders, and between two concentric spheres; (2) the 'signaling problem' generated by the sudden motion and heating of an infinite flat plate. (Author)

AD-618 344 Div. 9/1

Firestone Flight Sciences Lab., Calif. Inst. of Tech., Pasadena.

REPLY BY AUTHORS TO A. GOLDB RG.
Revised ed.,
by Wilhelm Behrens and Lester Lees. 7 Jan 65, 2p
Pub-604
Contract DA31 124ARO D33
Unclassified report

Pub. in A I A A Journal v3 n5 p991-2 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Wake, Hypersonic flow), (*Fluid dynamic properties, Wake), Turbulence, Reynolds number, Spheres, Cylindrical bodies, Boundary layer transition, Laminar boundary layer, Turbulent boundary layer.

A paper discusses hypersonic walses behind blunt bodies.

AD-618 349 Div. 20/2, 20/1

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
LEVELS OF Cr53 AND Cr55 FROM (d,p) REACTIONS,
by L. D. Singletary and M. R. Miller. 26 Oct 64, 3p
Unclassified report

Pub. in The Physical Review v138 n3B pB569-71 May 10 1965. (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nuclear energy levels, Chromium), (*Deuteron bombardment, Chromium), (*Chromium, Nuclear energy levels), Isotopes, Proton reactions, Excitation, Nuclear spectroscopy.

Chromium isotopes Cr52, Cr53, and Cr54 were bombarded with 2.8-MeV deuterons and the resultant protons analyzed with a 16-in. broad-range spectrograph. Comparison of results between 30- and 90-deg exposures corroborated most of the energy levels found. Energy levels are reported in Cr55 at 0.246, 0.522, 0.583, 0.881, 1.206, 1.474, 2.020, 2.268, and 2.779 MeV and in Cr53 at 0.568, 1.007, 1.297, 2.322, and 2.670 MeV. These are compared with recent experimental results. (Author)

AD-618 352 Div. 20/2

Hebrew Univ., Jerusalem (Israel). Dept. of Physics.
HYPERFINE INTERACTIONS IN THE GROUND STATE AND 22-keV STATE OF Sm149 IN FERRIMAGNETIC COMPOUNDS OF SAMARIUM,
by S. Ofer, E. Segal, I. Nowik, E. R. Bauminger, and L. Grodzins. 18 Aug 64, 12p
Contract AT30 1 2098; Grant AF EOAR24 64
AFOSR 65-0760
Unclassified report

Pub. in The Physical Review v137 n2A pA627-38 Jan 18 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hyperfine structure, Samarium compounds), (*Samarium compounds, Ferromagnetic materials), (*Magnetic fields, Samarium compounds), Ground state, Nuclear energy levels, Mossbauer effect, Iron, Garnet, Isomeric transitions, Nuclear spins, Crystal structure.

Hyperfine interactions in SmFe2, SmFeO3, Sm metal, and particularly in samarium iron garnet, SmIG, have been studied at various temperatures using the Mossbauer effect in Sm149. Large magnetic hyperfine interactions are observed in SmIG even at room temperature, in contrast with the observed Sm sublattice magnetization. A value of (1.55±0.25)X1,000,000 Oe was found for the magnetic field acting on the Sm nucleus in samarium iron garnet at 20K. For SmFe2 an upper limit of 1,000,000 Oe was found for H at 77K. The experimental results support an assignment of a spin 5/2 for the 22-keV level and yield a value of 1.26±0.04 for the ratio of the magnetic moments of the 22-keV state and the ground state. A small isomeric shift -0.9±0.3mm/sec was found between Sm metal and Sm2O3 absorbers at 300 and 80K. Upper limits for H in SmFeO3 were found to be 4X 100,000Oe 16K, 1.9 X 100,000 Oe at 80K, and 1.5 X 100,000 Oe at 300K. The origin of the temperature dependence of the hyperfine fields acting on Sm nuclei in SmIG is discussed, including the effects of the molecular exchange field and the electrostatic crystalline field. Comparison is also made with the theory of magnetization of Sm sublattices. Exchange effects are found to be strong and dominant at high temperatures, whereas at low temperatures, crystalline-field effects are found to be predominate. (Author)

AD-618 354 Div. 25/5, 15/1

Texas Univ., Austin. Dept. of Mathematics.
QUATERNIONS IN RELATIVITY,
by Peter Rastall. 1964, 17p
Grant AF AFOSR454 63, Proj. 9749, Task 974901
AFOSR 65-1017
Unclassified report

Pub. in Reviews of Modern Physics v36 n3 p820-32 Jul 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Relativity theory, Complex numbers), (*Complex numbers, Matrix algebra), Field theory, Tensor analysis, Geometry, Transformations-(Mathematics).

The quaternion formalism is applied to special relativity and Riemannian space-time. Though quaternions introduce some difficulties in manipulation, they combine the advantages of spinor calculus and the matrix notations of Pauli and Dirac, in that field equations can be written in terms of quaternions which correspond to generalizations of the Pauli spin matrices, and have a clear physical meaning as the vectors of the reference tetrad. An account of quaternion algebra and an introduction to the tetrad formalism of Riemannian geometry are given. (Author)

AD-618 355 Div. 25/6

University of Southern California, Los Angeles.
PAIRING ENERGY OF LITHIUM AND BORON IN SILICON,
by W. G. Spitzer and M. Waldner. 15 Jan 65,5p
Grant AF AFOSR496 64, Proj. 4751
AFOSR 65-0915
Unclassified report

Pub. in Physical Review Letters v14 n7 pA552 1-2-2 Feb 15 1965 (Copies not available to DDC or Clearinghouse customers).
Prepared in cooperation with North American Aviation Science Center, Thousand Oaks, Calif.

Descriptors: (*Silicon, Infrared properties), (*Boron, Absorption spectrum), (*Lithium, Absorption spectrum), (*Infrared spectroscopy, Silicon), Ions, Impurities, Impregnation, Energy, Band spectrum.

Recent studies have shown that isolated substitutional boron impurities in silicon give rise to an infrared

active, local mode of vibration. Several samples of B-doped Si compensated with Li were measured as a function of temperature between room temperature and approx 200C. At 25C the weak B10 absorption band near 644/cm- is seen with 3 other bands, 681, 584, and 522/cm-. It is further observed that the 644/cm- band increases in strength with increasing temperature; the other bands show a related decrease. These results are interpreted as additional evidence for Li-B ion pairing. (Author)

AD-618 366 Div. 8/6
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ON AXIS FAR-FIELD BACKSCATTERING FROM FLARED AXIALLY SYMMETRIC BODIES,
by Herschel Weil and Joseph L. Raymond.
Jul 65, 28p Memo. no. RM-4373-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Radar reflections, Bodies of revolutions), Optics, Wedges, Rings, Scattering, Mathematical analysis, Flared afterbodies, Radar echo areas.

This memorandum presents a physical-optics solution for the backscattering from a concave ring singularity. The solution for a convex ring singularity has been known for some time. When taken together, the two solutions provide a simple way for estimating the backscattering from ring singularities of practically every type. Since the radar returns from rings are often dominant, the solutions should have many important applications. (Author)

AD-618 369 Div. 25/6
CFSTI Prices: HC$3.00 MF$0.75

Naval Ordnance Test Station, China Lake, Calif.
STRESS WAVE PASSAGE IN SELECTED ROCK FABRICS. Technical publication,
by Carl F. Austin, Werner Goldsmith, and Stephen Finnegan. Jun 65, 68p Rept. no. NOTS-TP-3793
NAVWEPS 8734 Unclassified report

Descriptors: (*Igneous rock, Mechanical waves), (*Mechanical waves, Igneous rocks), Aluminum alloys, Stresses, Rods, Loading(Mechanics), Basalt, Impact shock, Mechanics, Tensile properties, Compressive properties, Fracture(Mechanics).

A study was made on the transmission and decay of pulses produced by impact in a very coarse-grained leucogranite, a fine-grained spessartite, and a fine-grained to aphanitic basalt. For most tests, ballistically suspended Hopkinson bars of these rock materials, 0.845 inches in diameter and 18 inches long, were subjected to longitudinal impact by 1/2-inch-diameter hardened steel spheres at an initial velocity of 3,250 ± 1.5% ips. Strain gages attached to the specimens at various stations recorded the shape and velocity of propagation of the resultant wave in the rock rod. Similar experiments were performed on an aluminum alloy rod of identical size to assess the magnitude of the dispersion resulting from the three-dimensional character of the rod. The nature of the pulse transformation during passage permits an assessment of the validity of various models proposed for geologic substances in the field of seismology. Static tests on virgin and shocked rods were generally found to agree with predicted effects of stress wave passage on the rock structure. These effects include compressive-strength loss in the impact end and tensile-strength loss in the distal end as the result of oriented fractures and a general lowering of the static Young's modulus. (Author)

AD-618 380 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
THE EXCITATION OF HIGHER MODES BY THE HELICAL INSTABILITY,
by Roy R. Johnson. Apr 65, 48p Rept. no. D1-82-0439
Unclassified report

Also available from the author.

Descriptors: (*Plasma oscillations, Excitation), (*Plasma medium, Stability), Helixes, Magnetic fields, Perturbation theory, Partial differential equations.

The conditions whereby the helical instability can excite higher modes in the plasma column are investigated. As the amplitude of the helical instability increases it changes the radial distribution of the averaged charge density. The finite amplitude theory of the helical or m = 1 instability is employed to determine the averaged charged density which is then used to determine the conditions for the onset of the m = 2 instability. The onset of the m = 2 instability is thus determined as a function of the amplitude of the helical instability for specified conditions within the plasma column. These results are then combined with the energy balance relationship of the positive column. The wavelengths and frequencies of the helical and m = 2 modes are determined for the conditions at the onset of the m = 2 mode. The wavelength of the m = 2 mode is found to be shorter than for the helical mode whereas the frequency is found to be greater. (Author)

AD-618 382 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
THE PRODUCTION OF DENSE BEAMS OF LOW-ENERGY IONS,
by M. J. Kofoid, C. M. Braams, and P. Zieske.
Jun 65, 18p Rept. no. D1-82-0436
Unclassified report

Also available from the author.

Descriptors: (*Ion beams, Production), (*Electromagnetic lenses, Design), Plasma medium, Energy, Electrodes, Deceleration, Density.

Dense beams of positive ions of less than 1.0 deV energy were produced using a duoplasmatron with an extraction voltage of 20 kV as a source. Outward radial electrostatic forces due to space charge impose a restriction upon the intensity of an ion beam while it is being formed in vacuum. The paper discusses the problem of designing the electrostatic lens system for decreasing the energy of the ions while simultaneously focusing them to produce a maximum-density parallel beam. The system consisted of a unipotential lens, which was integral with the source, and two additional immersion lenses. Most of the deceleration and beam compression was accomplished in the last lens. Its design was the major problem. Because a fairly exact analysis would have been very complicated, a simple approximate method for designing this lens was devised. The design values of current in the final low-energy beam checked well with those from experiment. (Author)

AD-618 383 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
COMPOSITION OF NOBLE GAS ION BEAMS PRODUCED WITH A DUOPLASMATRON,
by C. M. Braams, P. Zieske, and M. J. Kofoid.

Jun 65, 23p Rept. no. D1-82-0437 Unclassified report

Also available from the author.

Descriptors: (*Ion beams, Helium group gases), (*Helium group gases, Ion beams), (*Plasma medium, Helium group gases), Argon, Krypton, Xenon, Analysis, Magnetic fields.

Beams of noble gas ions produced with a duoplasmatron ion source were magnetically analyzed while the gas pressure in the source was varied. At high pressure the beam consisted primarily of singly-charged ions. With decreasing pressure the yield of multiply-ionized ions increased and was finally limited by the rising arc voltage which caused overheating of the anode. No measurable amount of He(2+) or Ne(2+) was detected. In the other gases the following maximum yields were measured for the more highly ionized species: 63% A(2+), 54% Kr(2+), 16% Kr(3+), 24% Xe(2+), and 1.2% Xe(3+). Traces of molecular ions were detected in all the noble gases studied. (Author)

AD-618 384 Div. 25/3, 25/6
CFSTI Prices: HC$2.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
SOME RELATED PHENOMENA IN PLASMAS IN SOLIDS AND IN GASES,
by James E. Drummond. Mar 64, 39p
Rept. no. D1-82-0419
Unclassified report

Also available from the author.

Descriptors: (*Plasma medium, Solids), (*Semiconductors, Plasma physics), Gases, Stability, Magnetic pinch, Discharge tubes, Helixes, Reviews.

The purpose of the article is to review some examples of plasma phenomena in solids which are related to those in gases and to show how recognition of the relationships has extended plasma research and enlarged its area of application. (Author)

AD-618 389 Div. 25/4
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
DIFFRACTION SYNCHRONIZATION OF LASERS,
by N. G. Basov, E. M. Belenov, and V. S. Letokhov.
16 Jul 65, 8p Rept. no. ATD-T-65-47
TT 65-62666
Unclassified report

Difraktsionnaya Sinkhronizatsiya Opticheskikh Kvantovykh Generatorov.
Trans. of Akademiya Nauk SSSR. Doklady v161 n3 p556-59 1965.

Descriptors: (*Semiconductor devices, Lasers), (*Lasers, Diffraction), Resonance, Dipole moments, Stability, Differential equations, Mirrors, USSR.

Conditions are given for the existence of a 'radiating mirror' laser in which a semiconducting layer is applied directly to the mirrors of the resonator; the said layer being divided by absorbing partitions into separate isolated cells. Such an arrangement increases the efficiency of large semiconductor lasers while suppressing parasitic generation in the plane of the mirror. The diffraction coupling coefficient of open resonators is calculated, and the stability conditions of the synchronized system is determined.

AD-618 399 Div. 8/6, 25/4
CFSTI Prices: HC$7.00 MF$1.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
OPACITY OF HIGH-TEMPERATURE AIR.
Technical rept. for 15 Jan 62-15 Nov 64,
by B. H. Armstrong, R. R. Johnston, and P. S. Kelly.
Jun 65, 312p Rept. no. 8-04-64-2
Contract AF29 601 5006, Proj. 5710, Task 07003
WL TR-65-17
Unclassified report

Descriptors: (*Air, Optical properties), (*Optical properties, Air), High-temperature research, Electromagnetic waves, Absorption, Plasma medium, Atomic properties, Atomic energy levels, Mathematical analysis, Statistical mechanics, Oxygen, Nitrogen, Programming(Computers), Photoelectric effect, Scheduling, Theory.

A new calculation of the opacity of high-temperature air (kT = 1 - 20 eV) is carried out. Line (bound-bound) transitions are included and LS term splitting of configurations is accounted for in the n = 2 and 3 levels. The primary purpose of the calculation is to remove the hydrogenic approximation to the dominant photoelectric and line transitions. In place of the hydrogenic approximation, Hartree-Fock-Slater matrix elements are used for the line transitions. For the photoelectric transitions, a combination of the Burgess-Seaton extension of the Coulomb approximation, and a high-energy acceleration-matrix-element Born approximation is employed. Comparisons are carried out with experiment and with previous calculations. A review and discussion is presented of the statistical mechanics of ionized gases, and some new results pertinent to the calculation of occupation numbers are presented. (Author)

AD-618 403 Div. 25/6, 8/4
CFSTI Prices: HC$2.00 MF$0.50

Airborne Instruments Lab., Deer Park, N. Y.
STUDY OF SOLID-STATE AND TRAVELING-WAVE MASER TECHNIQUES.
Quarterly rept. no. 6, Jan-Mar 65,
by C. Allen, J. A. DeGruyl, W. W. Heinz, S. Okwit, and J. G. Smith. Jun 65, 29p
Contract AF30 602 2989, Proj. 4506, Task 450602
RADC Tr-65-148
Unclassified report

See also AD-614 651.

Descriptors: (*Masers, Broadband), Traveling-wave tubes, Microwave amplifiers, Superconductors, Semiconductor devices, Relaxation time, Waveguides, Limiters, Pulse modulation, Pumping(Electronics), Gallium alloys, Arsenic alloys, Crystal oscillators, Cryogenics.

The purpose of the program is to develop improved maser techniques and apply them to a broad-band maser system. The breadboard maser system is in its final stages of fabrication and assembly. Details of the system are described and performance tests will begin shortly. Anamolous limiting effects reported earlier for the semiconductor limiter were found to be caused by relaxation effects in the material. Measurements of a final configuration are presented and a novel pulse modulator mode of operation for the device is described. The Gunn effect in semiconductors was investigated as a possible pump source for traveling-wave masers. An initial study indicates that this approach to a solid-state pump source may be worthwhile. (Author)

AD-618 410 Div. 25/4, 15/1, 8/3
CFSTI Prices: HC$1.00 MF$0.50

Cruft Lab., Harvard Univ., Cambridge, Mass.
OBTAINING THE EQUATIONS OF MOTION FOR PARAMETRICALLY COUPLED OSCILLATORS OR WAVES.
Technical rept.,
by A. E. Siegman. 3 May 65, 21p
Rept. no. TR-469
Contract Nonr186616, Proj. NR372 012
Unclassified report

Descriptors: (*Oscillators, Partial differential equations), (*Partial differential equations, Electromagnetic waves), Hamiltonian, Power series, Harmonic oscillators, Parametric amplifiers, Frequency converters.

By employing appropriately defined mormal mode amplitudes as variables, one can cast the equations of motion for any parametric system into a general coupled-mode form, where this form depends on the number of frequency components present and on the order of the nonlinearities present, but not on any other details of the particular physical system. A simple procedure, based on a Hamiltonian approach, is given, by which one may obtain the general form of the equations of motion for any multi-frequency parametric system, including parametrically coupled oscillators with growth in time, parametrically coupled running waves with growth in both time and distance. The general equations obtained by this procedure are useful for pedagogic purposes and general discussions; as a means of either avoiding the need for, or checking the results of, more complicated derivations on specific physical systems; as the starting point for quantizing the parametric system; and as a means of proving the Manley-Rowe relations, which emerge very directly from the resulting general equations. (Author)

AD-618 420 Div. 20/2, 25/5

Palmer Physical Lab., Princeton Univ., N. J.
DISPERSION RELATIONS AND THEIR CONNECTION WITH CAUSALITY,
ed. by E. P. Wigner. 1964, 270p
Contract AF49 638 1333, Proj. 9751, Task 975101
AFOSR 65-0841
Unclassified report

Proceedings of the International School of Physics 'Enrico Fermi,' Course 29, held at Varenna, Italy, 15 Jul-3 Aug 63. Available from Academic Press, 111 Fifth Avenue, New York 3, N. Y.

Descriptors: (*Nuclear scattering, Field theory), (*Field theory, Quantum mechanics), Invariance, Momentum, Matrix algebra, S-matrix, Neutron scattering, Relativity theory, Perturbation theory, Elementary particles, Meson scattering.

The aim of the lecture series presented at the International School of Physics Enrico Fermi, Varenna, Italy, is to present the main steps to follow in the standard proof of dispersion relations. Seven papers which were presented in course number 29 are contained in this book. These papers are: (1) The Role of Invariance Principles in Natural Philosophy, by E. P. Wigner; (2) The Proof of Dispersion Relations, by M. Froissart; (3) Causality, R-Matrix, and Collision Matrix, by E. P. Wigner; (4) Dispersion Relations and Applications, by D. Y. Wong; (5) The Nonrelativistic Angular-Momentum Plane, by R. G. Newton; (6) Production Amplitudes, by P. V. Landshoff; and (7) High-Energy Scattering and Dispersion Theory, by R. Oehme. (Author)

AD-618 429 Div. 25/2, 17/7, 25/7

California Inst. of Tech., Pasadena.
Div. of Chemistry and Chemical Engineering.
X-RAY DIFFRACTION STUDIES OF STABLE AND SUPERCOOLED LIQUID GALLIUM,
by S. E. Rodriguez and C. J. Pings. 10 Sep 64, 3p
Unclassified report

Pub. in Journal of Chemical Physics v42 n7 p2435-7 Apr 1 1965 (Copies not available to DDC or Clearinghouse customers).
Supported by AFOSR and ONR.

Descriptors: (*Gallium, X-ray diffraction analysis), (*X-ray diffraction analysis, Gallium), Liquid metals, Supercooling, Stability, Molecular structure, Temperature, Density.

X-ray diffraction studies of stable and supercooled liquid gallium (mp 29.8C) between 0 and 50Cshow no important dependence of internal structure on temperature. Atomic radial-distribution functions were determined for 0, 10, 20, 29.5, 30, and 40 and 50C, from diffraction data to S=11/A-1. Diffraction measurements were made in reflection geometry with silver K alpha radiation, scintillation counter, and pulse-height analyzer. The density distribution indicates 11 near neighbors; there may be a Ga-Ga complex. (Author)

AD-618 432 Div. 25/3, 9/1

Cornell Univ., Ithaca, N. Y.
HYDROMAGNETICS OF A SPHERICAL CONDUCTOR,
by G. S. S. Ludford and M. P. Singh. 19 Aug 63, 1p
Contract Nonr40146; Grant NSF G19911
Unclassified report

Pub. in AIAA Journal np 1963 (Copies not available to DDC or Clearinghouse customers).
Technical rept. version available from CFSTI, $1.10, as AD-416 581.

Descriptors: (*Spheres, Magnetohydrodynamics), (*Magnetohydrodynamics, Spheres), Magnetic fields, Fluid flow, Electrical conductance, Equations.

Stewartson (Proc. Cambridge Phil. Soc. 52:301, 1956) demonstrated that the liquid inside a cylinder C, circumscribing a sphere with generators parallel to an applied magnetic field, moves with the sphere as if solid, while the flow outside C is cylindrical but complicated. It is now shown that a sphere of arbitrary nonzero conductivity, in contrast to a nonconducting sphere, ultimately behaves in the same way. In addition, the leading term in the decay of the magnetic disturbance is obtained.

AD-618 436 Div. 25/3, 25/4

Illinois Univ., Urbana.
CORRELATED INTERFEROMETRIC MEASUREMENTS OF PLASMA ELECTRON DENSITIES AT OPTICAL AND MICROWAVE FREQUENCIES,
by J. B. Gerardo and J. T. Verdeyen. 17 Feb 65, 3p
AROD 4832:4
Unclassified report

Pub. in Applied Physics Letters v6 n9 p185-7 May 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Plasma medium, Refractive index), (*Lasers, Interferometers), Microwave frequency, Cavity resonators, Electrons, Density.

A three-mirror laser interferometer is used to measure very small changes in the refractivity of a plasma at optical wavelengths and these are correlated with measurements made at microwave frequencies (70 Gc).

AD-618 437 Div. 20/1, 25/7

Columbia Radiation Lab., New York.
LIFETIME OF THE FIRST 1P1 STATE OF ZINC, CALCIUM, AND STRONTIUM.
Technical rept.,
by Allen Lurio, R. L. deZafra, and Robert J. Goshen.
9 Jan 64, 7p Rept. no. TR-19
Contract Nonr22645, Proj. NR014 302
Unclassified report

Pub. in The Physical Review v134 n5A pA1198-203 Jun 1 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Zinc, Atomic energy levels), (*Calcium, Atomic energy levels), (*Strontium, Atomic energy levels), (*Atomic energy levels, Measurement), Electron transitions, Excitation, Molecular beams, Resonance, Polarization, Quantum mechanics.

The lifetime of the first excited 1P1 state of zinc, calcium, and strontium was measured by the zero-field level-crossing technique. The results are: zinc tau(1P1)=1.41±0.04x10 to the -9th power sec, calcium tau(1P1)=4.48±0.15x10 to the -9th power sec, and strontium tau(1P1)=4.97±0.15x10 to the -9th power sec. The results are compared to earlier experimental results and also to theoretical predictions. It is found that our results are in excellent agreement with the Bates and Damgaard Coulomb approximation method for estimating the oscillator strengths. (Author)

AD-618 438 Div. 25/6, 25/8, 25/7

Brussels Univ., (Belgium).
THERMODYNAMICS OF SPIN SYSTEMS IN SOLIDS,
by J. Jeener, H. Eisendrath, and R. Van Steenwinkel.
14 Aug 63, 13p
Grant AF EOAR62 16, Proj. 9767, Task 976701
AFOSR 65-1082
Unclassified report

Pub. in The Physical Review v133 n2A pA478-90 Jan 20 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Radiofrequency spectroscopy, Nuclear spins), (*Nuclear spins, Thermodynamics), (*Thermodynamics, Nuclear spins), Dipole moments, Line spectrum, Energy, Entropy, Relaxation time, Lithium compounds, Fluorides, Magnetic fields, Hamiltonian, Absorption spectrum, Electromagnetic pulses, Belgium.

Quasiequilibrium states of the spin system in a solid are described in terms of one 'Zeeman' temperature for each spin species plus one 'dipole-dipole' temperature, T(D). Energy and entropy are calculated and used to predict the steady state of processes such as cross relaxation. It is predicted and demonstrated by an experiment on the nuclear spins in LiF that the state of the 'dipole-dipole' system has a strong influence on such steady states. Continuous wave (cw) and pulse spectroscopy are discussed for systems with low T(D). Techniques are proposed (and have been used) to measure T(D) and one Zeeman temperature simultaneously, using coherent pulse instrumentation, and for preparing a state of low T(D) in a large magnetic field by complete adiabatic demagnetization followed by sudden magnetization. A density matrix formalism is proposed for the description of quasiequilibrium situations in the case of 'spins' with unequally spaced energy levels. Finally the influence of the 'nonsecular' part of the spin-spin Hamiltonian on the quasiequilibrium states is estimated by a perturbation calculation, and the resulting description includes the cases of low- or zero-magnetic field and partly or completely overlapping absorption lines. (Author)

AD-618 440 Div. 25/5, 4/4

Wisconsin Univ., Madison.
SOME REMARKS ON THE USE OF THE VARIATIONAL PRINCIPLE FOR THE SECOND-ORDER ENERGY,
by Jean M. Epstein and Saul T. Epstein. 13 Jan 65, 2p
Grant NsG62 275
Unclassified report

Pub. in Journal of Chemical Physics v42 n10 p3630-1 May 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Calculus of variations, Energy), (*Quantum mechanics, Energy), Perturbation theory, Field theory.

It is shown that the second-order energy correction calculated by means of the Hylleraas variation principle with an approximate zero-order function need bear no special relationship to the true value. In particular, there may be considerable deviation from the true value even if the approximate zero-order wavefunction is nearly exact, unless one requires that the trial function be orthogonal to the approximate zero-order function. (Author)

AD-618 443 Div. 20/1

Indiana Univ., Bloomington. Dept. of Chemistry.
ON CERTAIN ATOMIC INTEGRALS INVOLVING PRODUCTS OF r SUB ij,
by R. A. Bonham. 15 Apr 64, 8p
Grant AF AFOSR602 64, Proj. 9760, Task 976002
AFOSR 65-0888
Unclassified report

Pub. in Journal of Molecular Spectroscopy v15 n2 p112-6 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Integrals, Atomic orbitals), (*Atomic orbitals, Integral transforms), Numerical analysis.

AD-618 447 Div. 25/6

Defense Research Telecommunications Establishment, Ottawa (Ontario).
INTERACTION BETWEEN OXYGEN AND ALUMINUM IN GERMANIUM,
by W. D. Edwards. 15 Apr 63, 2p
Unclassified report

Pub. in Journal of Applied Physics v34 n8 p2497-8 Aug 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Semiconductors, Impurities), (*Germanium, Semiconductors), (*Oxygen, Semiconductors), (*Aluminum, Semiconductors), Crystal growth, Crystallography, Chemical reaction, Aluminum compounds, Oxides, Electrical properties, Resistance(Electrical), Hall effect, Electrical conductance, Heat treatment.

The report discusses the reaction of oxygen with aluminum in germanium. This is especially interesting as an electrically inactive aluminum-oxygen complex is formed in the melt prior to the growth of the crystal.

AD-618 449 Div. 20/2

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
THE V51(p,n)Cr51 REACTION AS A NEUTRON SOURCE OF KNOWN INTENSITY,
by K. K. Harris, H. A. Grench, R. G. Johnson, and F. J. Vaughn. 23 Sep 64, 4p
Unclassified report

Pub. in Nuclear Instruments and Methods v33 p257-60 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Vanadium, Proton bombardment), (*Chromium, Neutron reactions), (*Neutrons, Sources), Particle accelerator targets, Neutron flux, Measurement, Radioactive isotopes, Stable isotopes, Gold.

The characteristics of the V51(p,n)Cr51 reaction and its use as a neutron source of known intensity are discussed. Experimental techniques for the preparation and use of vanadium targets are described. Data on the neutron yield from the V51(p,n)Cr51 reaction are presented for proton energies in the range from 1.58 to 2.28 MeV. (Author)

AD-618 451 Div. 25/1, 6/1

Lincoln Lab., Mass. Inst. of Tech., Lexington.
COMPARISON OF VECTOR AND AUTOCORRELATION PITCH DETECTORS,
by Leo I. Bluestein and Charles M. Rader. 19 Jan 65, 2p
Unclassified report

Pub. in Journal of Acoustical Society of America v37 n4 p751-2 Apr 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sound pitch, Acoustic detectors), (*Band-pass filters, Acoustic detectors), Vector analysis, Statistical functions, Correlators, Pitch discrimination.

The distance function of vector pitch detection is compared with an approximation derived by Sondhi. Using a geometric interpretation, differences between the two that may affect their pitch-detection capabilities are made evident. (Author)

AD-618 452 Div. 25/6, 17/2

Lincoln Lab., Mass. Inst. of Tech., Lexington.
EFFECTS OF HIGH-PRESSURE, HIGH-TEMPERATURE TREATMENT ON THE PROPERTIES OF ELECTRONIC MATERIALS,
by E. P. Warekois. 1964, 12p
Unclassified report

Pub. in Irreversible Effects of High Pressure and Temperature on Materials, Special Technical Publication n374 p163-73 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*High pressure research, Intermetallic compounds), (*Semiconductors, Phase studies), (*Intermetallic compounds, High pressure research), High-temperature research, Superconductors, Resistance(Electrical), Indium alloys, Antimony alloys, Tin alloys, Tellurium alloys, Pressure, Samarium alloys, Selenium alloys, Mercury alloys, Sulfur compounds, Cadmium alloys, X-ray diffraction analysis, Niobium alloys, Aluminum alloys, Gallium alloys, Transformation.

The application of high pressures and temperatures will usually produce very drastic changes in the properties of a material. These changes can be crystallographic transformations or severe distortions and are evidenced by changes in electrical resistivity. In the case of electronic materials, which are characterized by discrete energy bands, the changes are of such magnitude that entirely new species of the material are produced. This paper discusses some of the high-pressure phases produced in indium antimonide and some of the intermetallic tellurium compounds, including tin telluride. Examples of new materials synthesized under pressure are illustrated by a discussion of a samarium selenide compound. A general discussion of the stability of these high-pressure phases is presented with specific examples in the mercury-sulfur-selenium and mercury-cadmium-telluride systems. (Author)

AD-618 455 Div. 25/2

Lincoln Lab., Mass. Inst. of Tech., Lexington.
CONSTITUTIONAL SUPERCOOLING IN IODINE VAPOR CRYSTAL GROWTH,
by T. B. Reed and W. J. LaFleur. 11 Sep 64, 3p
Rept. no. JA-2423
Contract AF19 628 500
Unclassified report

Pub. in Applied Physics Letters v5 n10 p191-3 Nov 15 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Supercooling, Crystal growth), (*Crystal growth, Iodine), Vapors, Surface properties, Stability, Crystals.

It is shown that constitutional supercooling resulting in interface instability can occur during crystal growth from a multicomponent gas.

AD-618 457 Div. 20/1

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SPIN DENSITY OF s ELECTRONS IN IRON,
by T. A. Kaplan. 26 Jan 65, 3p
Unclassified report

Pub. in Physical Review Letters v14 n13 p499-501 Mar 29 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electrons, Spin), (*Iron, Atomic structure), Atomic energy levels, Magnetic properties.

AD-618 458 Div. 25/6, 4/4, 25/3

Lincoln Lab., Mass. Inst. of Tech., Lexington.
TRANSITION-METAL OXIDES WITH METALLIC CONDUCTIVITY,
by John B. Goodenough. 1964, 8p
Unclassified report

Pub. in Bulletin de la Societe Chimique de France p1200-7 1965 (Copies available only to DDC users).

Descriptors: (*Transition elements, Oxides), (*Oxides, Electrical conductance), (*Electron transitions, Oxides), Atomic orbitals, Chemical bonds, Vanadium compounds, Rhenium compounds, Tungsten compounds, Barium compounds, Strontium compounds, Titanates, Rutile, Molybdenum compounds, Chromium compounds, Crystal structure, Atomic energy levels.

Two possible mechanisms for metallic conductivity in transition-metal oxides are discussed: band formation on the transition-meta subbary and band formation via pi bonding orbitals. This permits a general classification of metallic oxides. Two electron-trapping mechanisms are also discussed: d-orbital localization via metal-metal homopolar-bond formation and pi-orbital localization via metal-nonmetal pi-bond formation. These ideas are applied to ReO3-based structures, including perovskites and the various tungsten bronzes, to the rutile-based structures, including the homologous series TinO2n-1, and to the complex beta and gamma vanadium bronzes. (Author)

AD-618 459 Div. 25/3, 25/6

Lincoln Lab., Mass. Inst. of Tech., Lexington.
MAGNETOABSORPTION OF THE INDIRECT TRANSITION IN GERMANIUM,
by John Halpern and Benjamin Lax. 6 Nov 64, 10p
Unclassified report

Pub. in Journal of Physics and Chemistry of Solids v26 p911-9 1965 (Copies available only to DDC users).

Descriptors: (*Electron transitions, Germanium), (*Magnetic properties, Germanium), Solid state physics, Cryogenics, Valence.

The indirect transition magnetoabsorption in germanium at 1.7K was studied in the Faraday configuration with the magnetic field perpendicular to the (100), (111) and (110) faces respectively and at fields of up to 74 kG. The main features in the Landau transition spectrum are due to transitions from the states at the top of the valence bands to the electronic ladders in the conduction band. The periodicities obtained in the spectra enabled us to determine the effective masses of the conduction band electrons; the values obtained are in good agreement with those determined from cyclotron resonance. A fine structure corresponding to the spacings of the ladders in the valence bands was observed superposed on the gross structure due to transitions to successive electronic levels; this fine structure was analyzed and a number of valence band levels were identified. Values of the free electron g-factor were deduced and correlated with theory. (Author)

AD-615 464 Div. 25/4, 25/6
CFSTI Prices: HC$1/00 MF$0.50

Korad Corp., Santa Monica, Calif.
GaAs LASER DIODES.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 64,
by R. A. Sehr. 31 Dec 64, 19p
Contract DA28 043AMC00235E, Proj. 1P6 22001A056
Unclassified report

Descriptors: (*Lasers, Diodes(Semiconductor)), (*Diodes(Semiconductor), Lasers), (*Gallium alloys, Arsenic alloys), Semiconductor devices, Power, Diffusion, Gold alloys, Powder alloys, Processing, Performance(Engineering).

This report describes the device development work performed on GaAs injection lasers during the second quarter of the contract period. Particular emphasis was placed on increasing the external power efficiency of the diode laser. Studies of laser performance as a function of junction depth have also been made, with the junction being formed by Zn diffusion from the vapor phase. Two metallizing methods were tried to determine the influence of the surface treatment on laser performance. Twenty laser diodes fabricated by previously-described techniques were delivered early in the report period. (Author)

AD-618 468 Div. 25/4
CFSTI Prices: HC$3.00 MF$0.75

Consiglio Nazionale delle Ricerche, Florence (Italy). Centra di Studio per la Fisica della Microonde.
LASER CAVITIES.
Final rept.,
by R. Pratesi, L. Ronchi, and G. Toraldo di Francia.
Apr 65, 81p
Contract AF61 052 720
AFCRL 65-481 Unclassified report

Descriptors: (*Lasers, Performance(Engineering)), (*Ruby, Lasers), Pumping(Electronics), Theory, Oscillation, Light pulses, Frequency, Distribution, Measurement, Italy.

A general analysis of the performance of a multiple axial cavity constituted by many ruby rods with plane and paralled surfaces has been carried out. The threshold condition for oscillation has been derived by applying a statistical treatment, and the theoretical results have been checked experimentally. A systematic analysis of the spectral output of the laser radiation was carried out together with an analysis of the spiking structure of the pulse. Far and near field patterns have also been studied. The extension of the multiple axial cavity to geometries other than the plane-parallel is briefly discussed. Finally the application of the multiple axial cavity to the production of giant pulse of enhanced monochromaticity has been tested, using glasses with variable transmission coefficient as light-switches. (Author)

AD-618 473 Div. 25/4, 8/6
CFSTI Prices: HC$2.00 MF$0.50

Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
NONLINEAR INTERACTION OF LASER BEAM WITH SOLIDS.
Final rept. for 1 Apr 63-30 Jun 65,
by A. K. Kamal and M. Subramanian. 30 Jun 65, 46p
Contract Nonr110024, Proj. NR015 803, ARPA Order 306 62
Unclassified report

Rept. on Proj. DEFENDER.

Descriptors: (*Beams(Electromagnetic), Polarization), (*Lasers, Polarization), (*Polarization, Lasers), Solids, Quartz, Light pulses, Beams(Electromagnetic), Harmonic analysis, Propagation, Crystals.

This project deals with two types of nonlinear interaction of intense laser beam with dielectric medium. The first and extensively studied phenomenon is the nonlinear dc polarization that is caused by the second order nonlinear polarization. The quartz crystal is choses as the dielectric medium. A quantitative relationship between the dc polarization and the intensity of the propagating laser beam is given. A convenient method of detecting dc polarization is presented. It is shown that the output voltage of the detector is linearly proportional to the intensity of the laser pulse. The second type of nonlineaar polarization presented in this report is the initiation of a study on the generation of subharmonics at optical frequencies using high intensity laser sources. The physical mechanism that is utilized for this purpose is the nonlinear interaction of electromagnetic radiation with certain types of crystalline media such as quartz and KDP. This nonlinear interaction results in parametric subharmonic generation under favorable conditions. The experimental arrangement used for this investigation is outlined. (Author)

AD-618 486 Div. 9/4, 31/5
CFSTI Prices: HC$3.00 MF$0.75

Ordnance Research Lab., Pennsylvania State Univ.,

University Park.
UNSTEADY PROPELLER FORCES.
Technical memo. (thesis),
by L. M. Casellini. 30 Jun 65, 73p
Rept. no. TM-504.2461-06
Contracts NOw65 0123d, NOw63 0209c
Unclassified report

Descriptors: (*Propellers(Marine), Vibration), (*Vibration, Propellers(Marine)), Propeller blades, Fluid flow, Turbulence, Force(Mechanics), Design, Mathematical analysis.

The problem of unsteady forces on a propeller operating in a non-uniform inflow and subjected to homogeneous, isotropic turbulence has been analyzed. Methods are presented for calculating the magnitude of the unsteady forces from these two causes. The theory is applied to a free-stream propeller operating in the wake of a single strut and in a turbulent flow. The calculations include variations of strut-to-propeller spacing, number of blades and blade sweep and show how unsteady forces are affected. In the case of a turbulent inflow, force spectra and the unsteady thrust coefficient are calculated. These quantities are seen to depend on two ratios: the characteristic eddy size divided by the propeller diameter, and the characteristic eddy size divided by the propeller blade chord length. It is shown that the unsteady forces due to turbulence are of the same order of magnitude as those due to a non-uniform inflow. (Author)

AD-618 487 Div. 25/6, 25/8
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Dept. of Physics.
INVESTIGATION OF LIQUIDS AND SOLIDS AT LOW TEMPERATURES.
Final rept. for 1 Jan 61-31 Mar 65,
by W. A. Little. Jun 65, 6p
Contract Nonr22558, Proj. NR017 634
Unclassified report

Descriptors: (*Low temperature research, Test equipment), (*Holmium, Cryogenics), (*Helium, Cryogenics), (*Cryogenics, Scientific research), Liquids, Solids, Liquefied gases, Electrons, Scattering, Nuclei, Voltage, Electron beams.

(a) Electron-Scattering Program: The aim of this program was to design and build an apparatus which would be used for study of the distribution of the electric charge in deformed atomic nuclei. This study was made by scattering high energy electrons from a system of oriented nuclei. (b) Investigation of Liquids and Solids at Low Temperatures: The aim of this program was to search for the existence of 'zero-sound' in liquid He(3) at low temperatures.

AD-618 494 Div. 25/6, 20/3
CFSTI Prices: HC$1.00 MF$0.50

Rensselaer Polytechnic Inst., Troy, N. Y.
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Quarterly progress rept. no. 8, 1 Nov 64-31 Jan 65,
by Roland M. Lichtenstein, H. James Willard, Jr., and John C. Corelli. 31 Jan 65, 21p
Contract DA36 039AMC02165E, Projs. OST59 74 01 004 36 00, OST59 00 21 830 23 00
Unclassified report

See also AD-618 495.

Descriptors: (*Semiconductors, Electron bombardment), (*Electron bombardment, Semiconductors), Silicon, Damage, Photoconductivity, Life expectancy, Radiation damage.

Transient radiation damage effects in high purity p-type silicon due to 50 MeV electrons were observed. Roughly equal changes in magnitude and decay time of photoconductivity occurred; 30 to 60% of these changes annealed out within the first few minutes after the electron pulse. (Author)

AD-618 495 Div. 25/6, 20/3
CFSTI Prices: HC$1.00 MF$0.50

Rensselaer Polytechnic Inst., Troy, N.Y.
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Quarterly progress rept. no. 7, 1 Aug-31 Oct 64,
by Roland M. Lichtenstein. 31 Oct 64, 19p
Contract DA36 039AMC02165E, Projs. 5974 01 004 36 00, 5900 21 830 23 00
Unclassified report

See also AD-433 623.

Descriptors: (*Semiconductors, Electron bombardment), (*Electron bombardment, Semiconductors), Silicon, Damage, Life expectancy, Photoconductivity, Radiation damage.

Existing equipment was modified and a reliable single pulse light source developed which can be used in the high radiation field of the LINAC target room. One run was made at the LINAC site during which a satisfactory method of obtaining a single electron pulse was found. From the run at the LINAC, it was found that significant permanent damage occurs in one electron burst; however, no transient radiation damage at 10 milliseconds after the electron pulse was observed. (Author)

AD-618 499 Div. 25/8, 9/1, 15/2
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
DIFFUSION WITH 'COLLISIONS' BETWEEN PARTICLES,
by T. E. Harris. Jul 65, 33p Memo. no. RM-4367-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Diffusion, Kinetic theory), (*Kinetic theory, Diffusion), Stochastic processes, Statistical functions, Statistical processes, Statistical distributions, Particles, Statistical mechanics.

Two or more particles diffuse on the same line. Each moves independently of the others according to the Brownian movement (Wiener process) except when collisions occur. An assumption is made about what happens at collisions. It is shown that if initially the particles are sprinkled on the line according to a Poisson process with rate 1, then the displacement of a single particle, for large time, has approximately a Gaussian distribution with standard deviation (2t/pi) to the 1/4 power, rather than t to the 1/2 power as in the case of an unimpeded particle. (Author)

AD-618 503 Div. 25/1
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
AC BREAKDOWN IN GASES.
Technical rept.,
by C. E. Muehe. 26 Feb 65, 30p
Rept. no. TR-380

Contract AF19 628 500
ESD TDR-65-53

Unclassified report

Descriptors: (*Gas discharges, Helium group gases), (*Gas ionization, Helium group gases), (*Helium group gases, Gas discharges), Voltage, Electrons, Secondary emission, Alternating current, Plasma physics, Bibliographies, Ionization potentials.

The breakdown potential of helium, neon, argon and xenon was measured over the frequency range from DC to 1000 Mcps, and the pressure range from 10 to the minus 8th power to 600 mmHg employing a glass breakdown cell with 1-cm spacing. Graphs showing contours of constant breakdown potential as a function pf pd and d/gamma are presented. These graphs show three distinct breakdown regions: (1) the diffusion-controlled region, (2) the secondary-electron-emission (multipactor) region, and (3) the low-frequency region. The breakdown mechanism in each of these regions is explained. An extensive bibliography on AC breakdown in gases is included. (Author)

AD-618 511 Div. 9/4
CFSTI Prices: HC$2.00 MF$0.50

Hydrodynamics Lab., Calif. Inst. of Tech., Pasadena.
NONLINEAR GRAVITY WAVES IN A THIN SHEET OF VISCOUS FLUID,
by C. C. Mei. Jun 65, 37p
Rept. no. E-97.9
Contract Nonr22035

Unclassified report

Descriptors: (*Gravity, Water waves), (*Water waves, Gravity), Viscosity, Nonlinear systems, Hydrodynamics, Partial differential equations.

A nonlinear theory of long gravity waves is developed for a highly viscous fluid of small depth. The expansion scheme of Lin and Clark for inviscid shallow waters is used, and discussions are then made for three different cases: a = O(E), O(E2), and O(E3), where a is the dimension less amplitude and E is the dimensionless depth. In the first case a new partial differential equation is obtained which involves a nonlinear diffusion term. In the second case the governing equation is shown to be of Burgers' type. In all three cases permanent waves are treated explicitly. A variety of wave forms is found in the third case when a = O(E3): monoclinal and polyclinal waves over an inclined bottom, as well as solitary and cnoidal waves on a vertical wall. Surface tension is not considered. (Author)

AD-618 512 Div. 25/3, 10/7
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
AERODYNAMIC CALCULATION OF A GAS FLAME IN MAGNETOHYDRODYNAMICS,
by L. P. Yarin. 28 Jul 65, 15p
Rept. no. ATD-T-65-58
TT 65-62676

Unclassified report

Trans. of Teplofizika Vysikikh Temperatur (USSR) v3 n2 p285-93 1965.
K Aerodinamicheskomu Raschetu Gazovogo Fakela v Magnitnoy Gidrodinamike.
Report on Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Magnetohydrodynamics, Flames), (*Flames, Aerodynamic characteristics), (*Combustion, Gases), Diffusion, Laminar boundary layer, Magnetic fields, Numerical analysis, Partial differential equations, Temperature, Velocity, USSR.

An approximate method is presented for calculating diffusional combustion of gas in a plane-parallel boundary layer in a magnetic field. The effect of the magnetic field on the aerodynamics of the gas flame is examined. (Author)

AD-618 514 Div. 25/8, 9/1
CFSTI Prices: HC$3.00 MF$0.75

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
HEAT TRANSFER IN CYLINDRICAL PIPES WITH TURBULENT FLOW AND ARBITRARY WALL FLUX AND TEMPERATURE DISTRIBUTIONS.
Technical rept.,
by John W. Goresh. May 65, 59p
Rept. no. ARL-65-84
Proj. 7065

Unclassified report

Descriptors: (*Heat transfer, Pipes), (*Pipes, Heat transfer), Cylindrical bodies, Turbulence, Temperature, Numerical analysis, Gas flow, Hypersonic wind tunnels.

The problem considered is that of finding the heat losses from a turbulent gas flowing through a pipe due to free and forced convection, conduction through the solid insulation and external wall radiation. Furthermore, along the inner wall, neither the heat flux nor the temperature variation is known in advance, but are determined by the losses from the outer wall. (Author)

AD-618 519 Div. 8/6, 8/1
CFSTI Prices: HC$2.00 MF$0.50

Sylvania Electronic Systems, Waltham, Mass. Applied Research Lab.
INFINITE CYLINDRICAL ANTENNA IMMERSED IN A WARM PLASMA.
Scientific rept.,
by S. R. Seshadri. 1 Jun 65, 29p
Rept. nos. SR-9, S-3040-9
Contract AF19 628 2410, Proj. 4642, Task 464202
AFCRL 65-408

Unclassified report

Descriptors: (*Antenna radiation patterns, Plasma medium), (*Antennas, Plasma sheath), (*Plasma medium, Antenna radiation patterns), Cylindrical bodies, Ionospheric propagation, Radiofrequency power, Electromagnetic shielding, Wave transmission.

The radiation characteristics of an infinite cylindrical antenna insulated from the surrounding warm plasma by a concentric cylindrical sheath of free-space are investigated for the case in which it is excited by means of a Delta function voltage source. The uncoupled electromagnetic (EM) and the plasma (P) space waves are excited. The radiation pattern and the normalized radiation resistance of the antenna for the EM and the P modes are studied as a function of i) the frequency, ii) the radius of the antenna and iii) the thickness of the insulation. The effect of the insulating ion sheath is found to be some significance only for the case of the P mode. (Author)

AD-618 520 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

Sylvania Electronic Systems, Waltham, Mass. Applied Research Lab.
RADIATION FROM AN ELECTRIC DIPOLE IN AN INFINITE

COLUMN OF WARM PLASMA.
Scientific rept.,
by S. R. Seshadri. 1 Jun 65, 33p
Rept. nos. SR-10, S-3040-10
Contract AF19 628 2410, Proj. 4642, Task 464202
AFCRL 65-409

Unclassified report

Descriptors: (*Plasma medium, Electrical properties), (*Excitation, Electromagnetic waves), Plasma oscillations, Plasma sheath.

The radiation characteristics of an axially oriented electric dipole situated at the center of an infinitely long, cylindrical column of warm plasma are investigated. Two types of surface waves are excited along the plasma column and their dispersion and power relations are examined. The radiation pattern in the far-zone and the radiation resistance arising from the space waves are evaluated and their dependence on the source frequency and the radius of the plasma column is discussed. (Author)

AD-618 523 Div. 25/8, 4/4
CFSTI Prices: HC$3.00 MF$0.75

Little (Arthur D.) Inc., Cambridge, Mass.
THERMODYNAMICS OF CONDENSED AND VAPOR PHASES IN THE BINARY AND TERNARY SYSTEMS OF Be-B-O, Al-B-O, Si-O, Al-Be-O AND Al-B-F.
Final rept.,
by Paul E. Blackburn. 31 May 65, 65p
ARPA Order 315-62

Unclassified report

Descriptors: (*Phase studies, Thermodynamics), (*Thermodynamics, Phase studies), Test methods, Vacuum apparatus, Balances, Mass spectroscopy, Vapor pressure, Evaporation, Boron compounds, Oxides, Silicon compounds, Beryllium compounds, Aluminum compounds, Rhenium, Fluorides, Transition temperature, Mixtures, Vapors.

Thermodynamic properties of binary and ternary vapor and condensed systems were obtained by measuring pressures by the Knudsen and Langmuir methods. Vacuum balances and a mass spectrometer were used in these studies.

AD-618 541 Div. 25/7, 20/1
CFSTI Prices: HC$2.00 MF$0.50

Ohio State Univ., Columbus.
NU3 BAND OF (15)N2(18)0 AT 4.66 MICRONS.
Master's thesis,
by James L. Griggs, Jr. 1965, 43p

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. A copy is available for public sale.

Descriptors: (*Nitrogen compounds, Oxides), (*Isotopes, Nitrogen compounds), (*Infrared spectroscopy, Nitrogen compounds), Band spectrum, Absorption spectrum, Molecular spectroscopy, Molecular rotation, Vibration, Spectrum analyzers.

The first observation of a new absorption band at 4.66 microns is reported. Wavelength measurements and analysis of this band have established its identity as the NU3 fundamental vibration-rotation band of the previously unobserved (15)N2(18)0 molecule. Arguments are advanced for confirming this identification. This new band was observed as an impurity band during the course of investigations pertaining to the infrared absorption spectrum of isotopically enriched nitric oxide, (15)N(18)0. The results obtained in this study prompted the subsequent chemical isolation of the (15)N2(18)0 molecule.

AD-618 544 Div. 9/1
CFSTI Prices: HC$3.00 MF$0.75

Arizona Univ., Tucson.
PREDICTION OF HEAT TRANSFER RATES FOR LOW REYNOLDS NUMBER TURBULENT FLOW IN TUBES.
Masters' thesis,
by Lowell W. Ormand. 1965, 75p

Unclassified report

Descriptors: (*Fluid flow, Pipe), (*Turbulence, Heat transfer), (*Heat transfer, Turbulence), Reynolds number, Mathematical prediction, Velocity, Boundary layer, Differential equations, Programming(Computers).

The problem considered is heat transfer to fully developed turbulent flow in circular tubes. The idealized flow conditions considered are: (a) smooth circular tubes, (b) steady flow, (c) constant fluid properties, (d) fully developed velocity and temperature profiles, and (e) constant wall heat flux. A generalized velocity profile was developed from the momentum equation by using Prandtl's mixing length concept to evaluate eddy shear stresses. To obtain the necessary radial distribution for the mixing length, experimental data from the literature and continuity considerations were applied. Under the assumption of equal eddy diffusivities, the energy equation was solved. The resulting analytical predictions, in the form of Nusselt numbers based on tube diameter, were compared to recent low temperature difference, downstream measurements with air. For turbulent flow below Reynolds numbers of 10,000, the agreement between semi-empirical analysis and experimental data was closer than for previous analyses. The prediction can be represented by a Dittus-Boelter form, Nu = 0.021 Re0.8Pr0.4 to within five per cent for Reynolds numbers above 4000. (Author)

AD-618 559 Div. 8/6, 25/3
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ON WAVE PROPAGATION IN ISOTROPIC HOT PLASMAS,
by H. Unz. Jul 65, 25p Rept. no. P-3176

Unclassified report

Descriptors: (*Wave transmission, Plasma medium), (*Plasma medium, Wave transmission), Propagation, Theory, Electromagnetic waves, Sound, Equations of state, Partial differential equations, Plasma physics, Differential geometry, Elasticity, Acoustics.

The electro-magneto-plasma-gas-dynamics (EMPGD) equations are summarized, based on the single fluid, continuum theory, macroscopic plasma dynamics theory. The derivation of the three dimensional wave equations for linearized, isotropic, compressible, hot plasma is reviewed. In accordance with a well used approach in the theory of elasticity, the wave equations are separated into the acoustic (longitudinal) and the electromagnetic (transverse) waves. (Author)

AD-618 560 Div. 8/6, 25/3
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
WAVE PROPAGATION IN INHOMOGENEOUS

ISOTROPIC HOT PLASMAS,
by H. Unz. Jul 65, 25p Rept. no. P-3178
Unclassified report

Descriptors: (*Wave transmission, Plasma medium), (*Plasma medium, Wave transmission), Propagation, Electromagnetic waves, Sound, Partial differential equations, Equations of state, Plasma physics, Theory, Differential geometry, Acoustics.

The three dimensional coupled wave equations for the electromagnetic and the acoustic wave propagating in inhomogeneous, isotropic, hot plasma are derived from the linearized electro-magneto-plasma-gas-dynamics (EMPGD) equations. The wave equations become uncoupled for propagation in the direction of the inhomogeneity. An asymptotic solution for this case is given with the WKBJ result as the first approximation. (Author)

AD-618 563 Div. 25/2, 25/7
CFSTI Prices: HC$4.00 MF$0.75

Air Force Cambridge Research Labs., Bedford, Mass.
INFRARED SPECTRA OF CRYSTALS.
Physical sciences research papers,
by Peter J. Gielisse and Shashanka S. Mitra. Jun 65, 101p Rept. nos. AFCRL-65-395, PSRP-109
Projs. 5621, 0000, Tasks 562105, 000028

Unclassified report

Descriptors: (*Crystals, Spectra(Infrared)), (*Infrared spectroscopy, Crystals), (*Absorption spectrum, Crystals), Absorption, Infrared radiation, Phonons, Reflection, Vibration.

The infrared absorption and reflection in a crystal due to the interaction of the incident electromagnetic field with its vibrational modes are described in this article. The concept of normal vibrations of a crystal is introduced by the example of a linear chain, and then is generalized to more complex 3-dimensional crystals. Methods of classifying unit cell modes by means of factor and site group analyses are pointed out. Dispersion of infrared radiation by an ionic crystal producing the reststrahlen spectrum is treated next, followed by the method of determination of optical constants from such a spectrum and also from attenuated total reflection and emission spectra. The role of vector k not equal 0 modes, where k = 2 pi/lambda represents the wave vector, in the interaction of more than one vibrational mode with the incident photon resulting in combination and overtone bands is discussed. Special emphasis is given on the optically active multiphonon processes in simple crystals. Examples are furnished by a discussion of the lattice infrared spectrum of AlSb followed by a comprehensive review of the multiphonon infrared absorption in diatomic cubic crystals. Infrared spectra of gypsum, CaSO4 2H2O and solid cyclopropane single crystals are described next as examples of more complex crystals. (Author)

AD-618 575 Div. 25/8, 9/7

Aerophysics Lab., Mass. Inst. of Tech., Cambridge.
EXPERIMENTAL INVESTIGATION OF THERMAL DIFFUSION EFFECTS IN LAMINAR AND TURBULENT SHEAR FLOW.
Revised ed.,
by Hans Thomann and Judson R. Baron. 31 Aug 64, 14p
Grant AF AFOSR62 407, Proj. 9781, Task 978101
AFOSR 65-1151 Unclassified report

Pub. in International Journal of Heat and Mass Transfer v8 p455-66 1965(Copies available only to DDC users).

Descriptors: (*Thermal diffusion, Gas flow), (*Laminar flow, Thermal diffusion), (*Turbulence, Thermal diffusion), Shear stresses, Aerodynamic heating, Helium, Nitrogen, Jets, Separation.

An experimental investigation was conducted to determine the order of magnitude of thermal diffusion across a laminar and a turbulent shear layer. A short length of a cooled free jet was passed through stationary gas and subsequently recaptured into a continuous circulating system. Various mixtures of helium and nitrogen were investigated. With temperatures of 78K in the jet and 310K in the surrounding chamber, steady-state helium concentrations in the laminar jet were as much as 7 per cent smaller than in the surroundings. The experimental results are in good agreement with a simplified analysis. With a turbulent shear layer between the jet and surroundings, the helium concentration inside the jet increases to within 0.1 per cent higher than the chamber level. The thermal diffusion ratio (i.e. thermal to mass concentration diffusion coefficients) in the turbulent shear layer was thus at least two orders of magnitude smaller than in the laminar case and of opposite sign. It is suggested that similar separation effects are to be expected for other steady flows with closed streamlines, such as base flows and flows past cavities. (Author)

AD-618 577 Div. 25/6, 25/8

Royal Military Coll. of Canada, Kingston (Ontario).
FLUX BUNDLE PENETRATION INTO SUPERCONDUCTING INDIUM DISKS,
by D. C. Baird. 13 Jan 65, 5p
Grant DRB9510 21

Unclassified report

Pub. in Canadian Journal of Physics v43 p971-2 May 1965(Copies available only to DDC users).

Descriptors: (*Superconductivity, Indium), (*Magnetic fields, Penetration), (*Indium, Superconductivity), Cryogenics, Disks.

AD-618 583 Div. 8/6, 2/7

Defence Research Telecommunications Establishment, Ottawa (Ontario).
GENERATION OF VERY LOW FREQUENCY AND HYDROMAGNETIC EMISSIONS,
by Neil M. Brice. 1965, 4p

Unclassified report

Prepared in cooperation with Carleton Univ. (Ottawa).
Pub. in Nature v206 n4981 p283-4 Apr 17 1965
(Copies available only to DDC users).

Descriptors: (*Very low frequency, Ionospheric propagation), (*Ionospheric disturbances, Very low frequency), Whistlers, Electron beams, Proton beams, Atmospheric electricity, Diurnal variations.

AD-618 596 Div. 25/6

Lincoln Lab., Mass. Inst. of Tech., Lexington.
ROTATING SHALLOW ELASTIC SHELLS OF REVOLUTION,

by Eric Reissner and F. Y. M. Wan. 16 Sep 64, 20p
Contract AF19 628 500
ESD TDR-65-268

Unclassified report

Pub. in J. Soc. Indust. Appl. Math. v13 n1 p333-52 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Elastic shells, Rotation), (*Bodies of revolution, Statics), Stresses, Differential equations, Nonlinear systems, Perturbation theory, Series.

This work studies the static behavior of a steadily rotating (shallow) shell of revolution. The deceptively reasonable results of a linear shell theory are shown to be often erroneous. In particular, the transition to a rotating disk must be handled by a non-linear theory. A nonlinear analysis leads to a rather peculiar problem in singular perturbation. The associated (principal) layer phenomenon takes place in the interior rather than near the edge(s) of the shell. The precise location of the layer is not known a priori and must be determined in the course of the analysis. The entire discussion can be made formal by means of the technique of matched asymptotic expansion. (Author)

AD-618 597 Div. 25/6

Lincoln Lab., Mass. Inst. of Tech., Lexington.
GaAs-InSb n-n HETEROJUNCTION: A SINGLE-CRYSTAL 'SCHOTTKY' BARRIER,
by Everett D. Hinkley, Robert H. Rediker, and Dale K. Jadus. 17 Feb 65, 3p
Contract AF19 628 500
ESD TDR-65-308

Unclassified report

Pub. in Applied Physics Letters v6 n7 p144-6 Apr 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Semiconductors, Crystal lattices), (*Composite materials, Semiconductors), (*Intermetallic compounds, Semiconductors), Single crystals, Gallium alloys, Arsenic alloys, Indium alloys, Antimony alloys, Electrical properties, Surface properties.

AD-618 598 Div. 25/8

Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
HEAT CONDUCTION FROM CIRCULAR CYLINDERS IN RAREFIED GASES,
by G. S. Springer and R. Ratonyi. 22 Feb 65, 6p
Paper no. 65-HT-4
Contract Nonr184193

Unclassified report

Pub. in Transactions of the ASME, Journal of Heat Transfer p1-6 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Helium group gases, Thermal conductivity), (*Thermal conductivity, Helium group gases), (*Cylindrical bodies, Heat transfer), Kinetic theory, Continuum mechanics, Equations.

A method is presented ror calculating the conductive heat transfer through gases contained between two concentric cylinders. The method of Lees and Liu (kinetic theory description at conductive heat transfer from a fine wire. Phys. Fluids, 5:1137-1148 (1962) (AD-275 009)) is extended to include incomplete thermal accommodation at the inner cylindrical surface, and a comparison is made between the two methods. These results are then compared to those of the low pressure and temperature jump methods. On the basis of this analysis, limits are obtained for the free-molecule, transition, temperature jump, and continuum regimes. (Author)

AD-618 615 Div. 25/6

RCA Labs. Div., Radio Corp. of America, Princeton, N. J.
AMBIPOLAR DIFFUSION OF FREE CARRIERS IN INSULATING CdS CRYSTALS,
by Peter Mark. 25 Aug 64, 9p
Contract DA31 124ARO D84
AROD 4017:5

Unclassified report

Pub. in Physical Review v137 n1A pA203-10 Jan 4 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript received 12 Jun 64.

Descriptors: (*Electric insulation, Diffusion), (*Cadmium compounds, Sulfides), Crystals, Photoconductivity, Space charges, Thickness, Equations.

A new method is described for measuring ambipolar diffusion of free carriers in insulating materials. Strongly absorbed light producing electron-hole pairs is shone on one surface of the material through a transparent noninjecting contact. These carrier pairs set up a concentration gradient extending into the interior due to ambipolar diffusion. To describe this process, the theory of ambipolar diffusion is extended to the insulator case of unequal lifetimes for electrons and holes and significant trapping of both types of carriers. Simultaneously, excess space charge of the same sign as the majority photocarriers is injected through an Ohmic contact on the opposite face and space-charge-limited current (SCLC) flow is established. The point of equality of these two charge distributions establishes an effective thickness. To a good approximation, this term can be inserted into the SCLC density formula. The thickness depends on the illumination intensity and therefore introduces an intensity dependence. The procedure was tested with insulating CdS crystals. (Author)

AD-618 617 Div. 25/5, 25/4

Texas Univ., Austin.
A REMARKABLE PROPERTY OF PLANE WAVES IN GENERAL RELATIVITY,
by Roger Penrose. 1965, 6p
Grant AF AFOSR454 63, Proj. 9749, Task 974901
AFOSR 65-1015

Unclassified report

Pub. in Reviews of Modern Physics v37 n1 p215-20 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Relativity theory, Electromagnetic waves), (*Electromagnetic waves, Relativity theory), Gravity, Astronomy, Topology, Geometry, Time, Measure theory.

The complete general-relativistic plane wave space-times (gravitational, electromagnetic, or both) are examined in relation to the focusing effect they exert on null cones. The following remarkable property is then obtained. No spacelike hypersurface exists in the space-time which is adequate for the global specification of Cauchy data. As a consequence, it is not possible to imbed a plane wave globally in any hyperbolic normal pseudo-Euclidean space. (Author)

AD-618 618 Div. 9/1, 2/1

Texas Univ., Austin. Dept. of Mathematics.
INSTABILITY OF THE EQUIPARTITION STATE IN A FLUID SPHERE,
by Jerome Kristian. 13 Mar 64, 11p
Grant AF AFOSR454 63, Proj. 9749, Task 974901
AFOSR 65-1019

Unclassified report

Pub. in Astrophys J v140 n1 p257-67 Jul 1 1964 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 24 Jan 64.

Descriptors: (*Equations of state, Fluid mechanics), (*Magnetohydrodynamics, Perturbation theory), Spheres, Compressible flow, Tensor analysis, Boundary value problems.

Perturbations of a toroidal equipartition state in a homogeneous, compressible sphere are investigated in the tensor virial approximation. The equipartition state mixes the radial pulsation and the lowest-order Kelvin oscillation of the sphere. For any fluid, the sphere is unstable if the magnetic energy M exceeds a critical value. This value depends upon gamma, the ratio of specific heats of the fluid, but in no case is it larger than 1/3 of the gravitational energy of the sphere. For gamma <8/5, it is the radial mode which becomes unstable; for gamma = 8/5, it is the Kelvin mode. For gamma = 8/5, neither of the lowest modes reduces to either the radial mode or the Kelvin mode in the limit of small M. The results are examined in the limit of large gamma (nearly incompressible fluid). (Author)

AD-618 621 Div. 25/4

Rochester Univ., N. Y. Dept. of Physics and Astronomy.
COHERENCE PROPERTIES OF OPTICAL FIELDS,
by L. Mandel and E. Wolf. 1965, 58p
AROD 4965:9

Unclassified report

Pub. in Reviews of Modern Physics v37 n2 p231-87 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electromagnetic fields, Optical properties), (*Light, Field theory), Optical analysis, Statistical analysis, Interference, Photoelectric effect, Quantum mechanics, Interferometers, Astronomy, Spectrum analyzers.

A review is presented of coherence properties of electromagnetic fields and their measurements, with special emphasis on the optical region of the spectrum. Analyses based on both the classical and quantum theories are described. After a brief historical introduction, the elementary concepts which are frequently employed in the discussion of interference phenomena are summarized. The measure of second-order coherence is then introduced in connection with the analysis of a simple interference experiment and some of the more important second-order coherence effects are studied. Their uses in stellar interferometry and interference spectroscopy are described. Analysis of partial polarization from the standpoint of correlation theory is also outlined. The general statistical description of the field is discussed in some detail. The recently discovered universal 'diagonal' representation of the density operator for free fields is also considered and it is shown how, with the help of the associated generalized phase-space distribution function, the quantum-mechanical correlation functions may be expressed in the same form as the classical ones. The sections which follow deal with the statistical properties of thermal and nonthermal light, and with the temporal and spatial coherence of black-body radiation. Later sections, dealing with fourth- and higher-order coherence effects include a discussion of the photoelectric detection process. (Author)

AD-618 630 Div. 25/2, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
STUDY OF BERYLLIUM AND CHROMIUM WHISKERS,
by V. M. Amonenko, B. M. Vasyutinskii, G. N. Kartmazov, I. I. Papirov, and G. F. Tikhinskii. 12 Jul 65, 8p Rept. no. FTD-TT-65-339
TT 65-62696

Unclassified report

Unedited rough draft trans. of mono. Issledovaniya Po Vysokoprochnym Splavam i Nitevidnym Kristallam. Doklady na Nauchnoi Sessii 1962, n. p. p34-6 1963.

Descriptors: (*Beryllium, Single crystals), (*Chromium, Single crystals), (*Crystal growth, Fiber metallurgy), (*Single crystals, Crystal growth), Mechanical properties, USSR.

The article describes experiments in growing whiskers of Be and Cr crystals through condensation from vapor in a vacuum. Properties of these crystals are studied.

AD-618 631 Div. 25/6, 8/2, 4/2, 25/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
MICROMINIATURIZATION OF ELECTRONIC DEVICES AND PROBLEMS OF CHEMISTRY,
by F. A. Kuznetsov. 16 Jul 65, 16p
Rept. no. FTD-TT-65-864
TT 65-62697

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Vestnik. v34 n6 p51-7 1964.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
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Descriptors: (*Microminaturization(Electronics), Semiconductors), (*Semiconductors, Crystal growth), (*Crystal growth, Semiconductors), Crystal structure, Purification, Films, Complex compounds, Vapor plating, Vacuum apparatus, Manufacturing methods, Epitaxial growth, Theory, Thermodynamics, USSR, Intermetallic compounds.

Theories of chemical structures and crystal chemistry of inorganic substances, methods and means of obtaining high-purity substances, complex compounds and their utilization in new techniques forming the basic trends in semiconductor electronics are discussed.

AD-618 632 Div. 25/4
CFSTI Prices: HC$3.00 MF$0.75

Minnesota Univ., Minneapolis.
Dept. of Electrical Engineering.
A THEORETICAL EXAMINATION OF OFF-AXIAL DIRECTIONALITY IN LIGHT FROM OPTICAL MASERS,
Technical rept.,

by Chandra M. Varma and R. J. Collins. 1965, 61p
Rept. no. TR-2
Contract NONR71061, Proj. NR015 704

Unclassified report

Master's thesis.

Descriptors: (*Lasers, Optical properties), Light, Theory, Polarization, Solid state physics, Reflection, Cavity resonators, Diffraction, Waveguides.

This dissertation is concerned with the evaluation of the field distribution at the mirrors which gives rise to the rings in the far field and an explanation as to why such field configurations are preferentially present. It is established that the rings are due to the propagation of high order TE and TM modes in the cavity. This is done by calculating the far-field pattern when the distribution characteristic of such modes exists at the aperture of optical masers. The angle of the ring has been related to the order of the mode. The appearance of rings at certain discrete angles has been explained by proving that the frequency degeneracy in a multimode cavity is dependent on the angle the wave vectors in the plane wave representation of the modes make with the axis. A very general method is used to prove that non-uniformities in the gain distribution inside the cavity lead to mixing of modes with the creation of new modes with reduced thresholds of oscillation. This extends the work of Collins and Giordmaine (Proc. of III International Congress in Quantum Electronics, Paris. Columbia Univ. Press, 1964) who came to the same conclusions for the case when there are non-uniformities in the reflectivity of mirrors.

AD-618 633 Div. 25/4
CFSTI Prices: HC$3.00 MF$0.75

Minnesota Univ., Minneapolis.
Dept. of Electrical Engineering.
FREQUENCY BEATS IN THE OFF-AXIS MODES OF RUBY LASERS.
Technical rept.,
by Donald Theodore Davis and R. J. Collins. 1965, 60p
Rept. no. TR-3
Contract NONR71061, Proj. NR015 704

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
Master's thesis.

Descriptors: (*Lasers, Frequency), Ruby, Rods, Cylindrical bodies, Diodes(Semiconductor), Rectangular bodies, Oscillation, Cavity resonators, Pumping-(Electronics), Reflection, Mirrors, Mixers(Electronics).

This paper describes the use of photomixing methods to study modes radiating in off-axis directions. In addition to the modes radiating axially in cylindrical ruby rods, it is possible to excite modes in rods with polished sidewalls which radiate in uniquely defined off-axis directions. The main purpose was to observe the best frequencies between off-axial modes, and see how parameters such as pump power and nonuniform reflectivity affect them. The microwave frequency beats between these modes were measured with the aid of a Philco 4501 photodiode and compared with the values predicted by ideal cavity resonator theory. The observed values agree very well with those predicted. In order to observe beats in the various off-axis 'rings', it is necessary to have a degree of control over the modes of oscillation. By selecting the proper nonuniform mirror reflectivity pattern, it was hoped that the thresholds of oscillation could be lowered for the local modes desired. Four different silvering patterns were used. The results indicate that it is possible to lower substantially the thresholds of oscillation of preselected modes with a proper choice of mirror silvering pattern, as long as the average reflectivity of the mirrors is not too drastically reduced.

AD-618 642 Div. 9/1, 9/7

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EXPERIMENTAL INVESTIGATION OF THE WAKE BEHIND A BODY OF REVOLUTION,
by L. I. Ilizarova and K. A. Pochkina. 25 May 65, 14p
Rept. no. FTD-TT-65-86
TT 65-62706

Unclassified report

Unedited rough draft trans. of Promyshlennaya Aerodinamika (USSR). n23 p99-106 1962.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is not available for public sale.

Descriptors: (*Bodies of revolution, Wake), (*Wake, Turbulence), Mathematical analysis, Axially symmetric flow, USSR.

AD-618 649 Div. 25/4, 8/2

Foreign Technology Div., Wright-Patterson AFB, Ohio.
OPTICAL AND OPTICAL-ELECTRONIC INSTRUMENTS (COLLECTION OF ARTICLES), NO. 110, 1962,
6 Apr 65, 166p Rept. no. FTD-MT-64-139
TT 65-62713 Unclassified report

Edited machine trans. of Moskovskoe Vysshee Tekhnicheskoe Uchilishche. Trudy (USSR). n110 p1-135 1962.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is not available for public sale.

Descriptors: (*Optical instruments, Design), (*Electronic equipment, Optical instruments), Photoelectric materials, Microphotometers, USSR, Reports.

Contents:
Selection of the relative aperture of the optical system in photoelectric devices
Automatic recording double-beam microphotometer
Method of calculation of kinematic indices during grinding and polishing of spherical surfaces
The current state of pancratic systems
Optical simulation of relative motion of objects in space
Three-component systems of variable magnification with a linear relationship between shifts of components
Survey of certain schemes of modulation of radiant flux; applied in photoelectric devices
Distortion of the profile of a surface during vacuum asperization
Deformation of a wave front during longitudinal defocusing for reflecting quadric surfaces of revolution.

AD-618 655 Div. 20/9, 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.

RECENT DEVELOPMENTS ON THE STANFORD 500 MEV ELECTRON STORAGE RINGS,
by Bernard Gittelman. Mar 65, 24p
Rept. no. HEPL-366
Contract Nonr22567

Unclassified report

Prepared for presentation at the Particle Accelerator Conference, Washington, D. C., 10-12 Mar 65.

Descriptors: (*Electron beams, Storage), (*Rings, Electron accelerators), Stability, Cyclotrons, Electron bombardment.

Beam instabilities that develop when stored electron beams pass through each other are studied.

AD-618 656 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High-Energy Physics Lab., Stanford Unif., Calif.
ELECTRODISINTEGRATION OF THE DEUTERON AT LOW MOMENTUM TRANSFER: MAGNETIC TRANSITIONS,
by J. Goldemberg and C. Schaerf. 4 Mar 65, 7p
Rept. no. HEPL-367

Unclassified report

Supported in part by ONR, AEC, and AFOSR.

Descriptors: (*Inelastic scattering, Electrons), (*Deuterium, Electron bombardment), Deuteron reactions, Momentum, Excitation.

The spectrum of electrons inelastically scattered from a deuterium target at 180 degrees was measured. At this angle the transition is mainly magnetic (spin-flip) and therefore the dominant state of the two nucleons after the transition should be a singlet with zero orbital angular momentum.

AD-618 657 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
INELASTIC ELECTRON SCATTERING FROM 018,
by G. J. Vanpraet. Apr 65, 8p Rept. no. HEPL-378
Contract Nonr22567

Unclassified report

Descriptors: (*Inelastic scattering, Electrons), (*Oxygen, Electron bombardment), Isotopes, Nuclear structure, Neutrons, Nuclear energy levels, Excitation.

The results of recent measurements obtained by electron scattering on 018 are presented. Nuclear excitations, including the giant dipole resonance, were observed in the energy spectrum of 69 MeV electrons inelastically scattered through 180 degrees.

AD-618 658 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
MAGNETIC ELASTIC ELECTRON SCATTERING FROM Be9, B10, and B11,
by G. J. Vanpraet and P. Kossanyi-Demay. Jun 65, 8p
Rept. no. HELP-379
Contract Nonr22567

Unclassified report

Descriptors: (*Elastic scattering, Electrons), (*Beryllium, Electron bombardment), (*Boron, Electron bombardment), Isotopes, Nuclear shell models.

The magnetic form factors of the p-shell nuclei Be9, B10, and B11 were measured for values of q sq. < 0.5 1/F sq., by elastic electron scattering at an angle of 180 deg.

AD-618 659 Div. 20/1
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
AN EMPIRICAL MASS FORMULA INVOLVING THE ELECTRON MASS,
by Reinhart Frosch. Jun 65, 10p Rept. no. HEPL-382
Contract Nonr22567

Unclassified report

Descriptors: (*Electrons, Mass number), Pions, Nucleons, Quantum mechanics, Perturbation theory.

A search for a rest mass quantum in the order of magnitude of a few MeV is reported. The search was stimulated by the observation that the accepted value of the electromagnetic mass splitting of the pion is very consistent with 9m (m = electron rest mass), and that the value of the proton mass is very close to an integral multiple of 9m.

AD-618 660 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
ETA PHOTOPRODUCTION IN THE REGION FROM THRESHOLD TO 900 MeV,
by R. Prepost, D. Lundquist, and D. Quinn. May 65, 16p Rept. no. HEPL-384
Contract Nonr22567

Unclassified report

Descriptors: (*Gamma-proton reactions, Differential cross section), Bremsstrahlung, Pions, Photonuclear reactions.

Measurements of the differential cross section of the process gamma + p to eta (o) + p were made in approximately 50 MeV intervals from threshold to 900 MeV. The yield of recoil protons is measured at a fixed momentum and angle as a function of the bremsstrahlung end point energy, and eta production is seen as a step in the proton yield at the appropriate threshold energy. The differential cross section at 90 degrees is characterized by a sharp rise near threshold reaching a maximum value of 1 microbarn/sr at 760 MeV, and then falling off to a value of 0.3 microbarn/sr at 900 MeV. A measurement of the differential cross section for 3 different angles at 790 MeV indicates that the cross section is isotropic in the center of mass at this energy. The interpretation of these results in terms of possible contributing partial waves will be discussed. (Author)

AD-618 661 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
PION-PAIR PHOTOPRODUCTION BELOW 1 BeV,
by J. V. Allaby, H. L. Lynch, and D. M. Ritson.
May 65, 17p Rept. no. HEPL-385
Contract Nonr22567

Unclassified report

Descriptors: (*Gamma-proton reactions, Pair production), (*Pair production, Pions), Meson cross sections, Differential cross section.

Measurements of the differential cross-section for the reaction gamma + p to pion (-) + pion (+) + p have been

made at several angles for photon energies in the range 550-1000 MeV, using the Stanford Mark III linear accelerator. The pion(-) were detected and momentum analyzed using a 90 degree magnetic spectrometer. It was found that the reaction was dominated by the pseudo-2-body photoproduction gamma + p to pion (-) + N* (1238) especially near the threshold for this process. At low momenta, the pion(-) were identified by range. At high momenta (>250 MeV/c), the contaminating electrons were eliminated by using a lead and scintillation-counter sandwich system. The yields of both pion (-) and pion (+) off hydrogen were measured and the normalization was obtained by comparing with the known cross-sections for gamma + p to pion (+) + n. Computer calculations of the shapes of the yield curves expected from 2-body and 3-body production enabled the data to be separated into the two possible states gamma + p to pion (-) + N* (1238) and gamma + p to pion (-) + pion (+) + p. Angular distributions and total cross-sections are presented. (Author)

AD-618 662 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
EXPERIMENTAL EVIDENCE FOR A POSSIBLE MESON-EXCHANGE CONTRIBUTION TO ELASTIC ELECTRON-DEUTERON SCATTERING,
by C. D. Buchanan and M. R. Yearian. Jun 65, 16p
Rept. no. HEPL-386
Contract Nonr22567

Unclassified report

Descriptors: (*Elastic scattering, Electrons), (*Deuterons, Electron bombardment), (*Meson reactions, Elastic scattering), Nucleons, Pions.

Measurements of magnetic (elastic) electron-deuteron cross sections at q-sq = 6.0, 7.0, 8.0, and 12.0 1/F-sq. Electric scattering was also observed at these q-sq values, as well as at one additional point (q-sq = 20.0 1/F-sq). An analysis of these data definitely indicates that the simple impulse approximation model of the deuteron, incorporating the best possible values for the nucleon form factors, is inadequate to explain the experimental results.

AD-618 663 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
REPORT ON THE INELASTIC ELECTRON SCATTERING PROGRAM AT STANFORD,
by H. Lynch, J. V. Allaby, and D. Ritson. Jun 65, 20p Rept. no. HEPL-387
Contract Nonr22567

Unclassified report

Descriptors: (*Inelastic scattering, Electrons), (*Protons, Electron bombardment), Pions, Scintillation counters.

A program for measuring the inelastic electron scattering cross section from protons over the range of electron energies available at Stanford is presently being pursued. Of the final products only the electron's momentum and scattering angle are observed. The process is schematically described where the electron emits a photon of four-momentum q ; the photon is absorbed and a composite system of mass M is formed (e.g. a proton and a pi(o) meson or a pion-nucleon resonance).

AD-618 664 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
POLARIZATION MEASUREMENTS ON THE RECOIL PROTON FROM PION (O) PHOTOPRODUCTION,
by D. Lundquist, J. V. Allaby, and D. M. Ritson.
Jun 65, 12p Rept. no. HEPL-388
Contract Nonr22567

Unclassified report

Descriptors: (*Gamma-proton reactions, Pions), (*Proton scattering, Polarization), Parity, Elastic scattering.

The polarization of the recoil proton in pion(o) photoproduction off hydrogen has been measured for photons in the range 500-1000 MeV, using the Stanford Mark III linear accelerator. Protons were detected at an angle b and momentum analyzed using a 90 degree magnetic spectrometer. The scattered protons were detected by two counter telescopes placed symmetrically to left and right of the carbon target and making angles ± C with respect to the direction of a proton emerging from the spectrometer. The measured asymmetry was obtained from the usual formula: e = L-R/L+R and the proton polarization P(b) was then obtained by substituting the known carbon analyzing power A(c) in the equation e(b,c) = (P(b) A(c). Using parity conservation it can be shown that P(b) = -P(b). Thus the running time was equally divided between measurements with the spectrometer at +b and -b. This technique enabled residual artificial asymmetries to be removed, since these do not change sign when b becomes -b. Preliminary results are presented and compared to existing data from various laboratories. (Author)

AD-618 674 Div. 8/6
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Lab., Corona, Calif.
MILLIMETER WAVE ATTENUATION THROUGH SNOW,
by J. W. Battles and D. E. Crane. 15 Jul 65, 10p
Task R360FR104 211 1R011 01 01
NAVWEPS 8816

Unclassified report

Descriptors: (*Snow, Radiofrequency interference), (*Radiofrequency interference, Snow), (*Millimeter waves, Attenuation), Wave transmission, Electromagnetic wave reflections, Measurement, Interferometers, Environmental tests.

Measurements of the attenuation of electromagnetic radiation through snow and the reflection of radiation from snow were made by using an interferometer and manufactured snow in an environmental chamber under closely controlled conditions. The ambient temperature was varied from -4 to +32 F, and the signal frequency from 31 to 38 Gc. No surface icing of the snow was allowed to form during the measurements. The signal losses for 10 different frequencies at two snow-sample temperatures are tabulated. Curves of the variation in attenuation and reflection as a function of temperature show that below 23 F the amount of energy reflected and the amount lost in attenuation decrease slowly with decreasing temperature. (Author)

AD-618 683 Div. 25/3
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF WAVES OF IONIZATION IN A PULSED DISCHARGE,
Masters' thesis,
by Harold E. Johnson. Jun 65, 68p
Rept. no. GGC/EE/65-7 Unclassified report

Descriptors: (*Glow discharges, Gas ionization), (*Gas ionization, Glow discharges), (*Plasma medium, Gas ionization), Glow lamps, Mercury, Vapors, Argon, Spectroscopy, Photomultipliers, Image tubes, Absorption spectrum, Electromagnetic pulses, Propagation.

The study consists of a series of experiments in plasma physics to glean information about the time history of the initiation of a glow discharge in a low pressure gas. General characteristics of a specific glow lamp containing an admixture of mercury vapor and argon were determined. Subsequent experiments were performed spectrally by use of spectroscope, photomultiplier and image converter methods, to evaluate the conditions of the plasma from initial breakdown through the initiation of the first striations. A novel and generally useful method of time resolved, spectrally resolved, absorption measurement is demonstrated with application to the present investigation. (Author)

AD-618 685 Div. 25/6
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INVESTIGATION OF SOLID STATE DISPLAY CONTROL CIRCUITRY.
Masters' thesis,
by James Richard Wade. Jun 65, 75p
Rept. no. GGC/EE/65-17

Unclassified report

Descriptors: (*Electroluminescence, Display systems), (*Circuits, Display systems), Control systems, Semiconductor devices, Switching circuits.

Electroluminescent phosphors and lamps have advanced during recent months to the point that usable electroluminescent displays are now practical. However, there exists a considerable gap in between the technology of displays and that of the necessary solid state control circuitry. This work is an attempt to develop such control circuitry. The various advantages and disadvantages of ferroelectric elements, photoconductors, and silicon controlled rectifiers are analyzed. Silicon controlled rectifiers are selected as primary control elements, and control circuits are developed for bar graph and pointer displays. The pointer display uses SCR controlled variable voltage dividers and provides for the control of several lamp segments by a single control element. (Author)

21. Propulsion and Fuels

AD-617 936 Div. 27/2
CFSTI Prices: HC$4.00 MF$0.75

Boeing Co., Renton, Wash. Airplane Div.
COMPRESSOR NOISE RESEARCH.
Final technical rept.,
by David A. Bateman, Stephen C. Chang, Bruce T. Hulse, and John B. Large. Jan 65, 103p
Contract FA64WA4920, Proj. 361 12H
FAA-ADS 31

Unclassified report

Descriptors: (*Jet engine noise, Aexial-flow compressor blades), (*Axial-flow compressor blades, Compressor noise), (*Compressor noise, Axial-flow compressor blades), Axial-flow compressors, Compressor noise, Noise analyzers, Aerodynamic loading, Lift, Thickness, Compressor rotors, Compressor stators, Tolerances(Mechanics), Fluid flow, Mathematical analysis, Aerodynamic characteristics, Jet engine inlets.

The noise generating mechanisms of axial flow compressor blades were investigated using flat blades to facilitate mathematical analysis. Analytical expressions are given for evaluating the compressor noise due to blade thickness, loading and vortex shedding. Measured values of compressor noise show good agreement with those analytically predicted. It was found that lift or loading noise dominates over blade thickness and vortex noise. Rotor-stator spacing and clearance between the rotor blade tips and the duct are important paramenters in the generation of rotor noise. (Author)

AD-617 938 Div. 10/7, 4/4
CFSTI Prices: HC$3.00 MF$0.75

United Technology Center, Sunnyvale, Calif.
VAPOR-PHASE COMBUSTION OF BERYLLIUM AND ALUMINUM.
Final technical summary rept. for 1 Dec 62-30 Nov 64,
by R. W. Hermsen and R. W. Woolfolk. 31 Dec 64, 60p Rept. no. UTC-2040-FR
Contract AF49 638 1202, Proj. 9751, Task 975101
AFOSR 65-1056

Unclassified report

Descriptors: (*Beryllium, Combustion), (*Aluminum, Combustion), (*Combustion, Vapors), High-pressure research, High-temperature research, Vaporization, Oxides, Reaction kinetics, Propellants.

An experimental investigation of the vapor-phase combustion of aluminum and beryllium was undertaken using electrically vaporized wires as the source of high-temperature, high-pressure metal vapor. Specifically investigated were (1) the overall reaction rates for the conversion of metal vapor to condensed oxide; (2) the significant species which are present and may act as reaction intermediates; and (3) the detailed mechanism of the combustion including the nucleation and growth of condensed oxide particles. (Author)

AD-617 962 Div. 10/7, 22/6
CFSTI Prices: HC$2.00 MF$0.50

Michigan Univ., Ann Arbor. Aircraft Propulsion Lab.
THE INFLUENCE OF WATER VAPOR ADDITION ON HYDROGEN-OXYGEN DETONATIONS.
Technical rept. no. 1,
by B. F. Kerkam and E. K. Dabora. Apr 65, 42p
Rept. no. 06996-1-T
Contract DA31 124ARO D299, Projs. 20014501B33G, 06996
AROD 5209:1

Unclassified report

Descriptors: (*Detonations, Quenching(Inhibition)), (*Hydrogen, Detonations), (*Oxygen, Detonations), (*Water vapor, Detonations), Explosions, Reaction kinetics, Detonation waves.

The minimum detonation Mach number, below which detonative combustion is not possible, can be predicted by Belles' explosion limit criterion for H2-O2 mixtures. The criterion predicts also that the addition of water vapor increases this minimum Mach number. The experiments which are described here and which are based on the technique of slowing down an established Chapman-Jouguet detonation wave by exposing one of its sides to a compressible boundary verify this prediction. It is found that the addition of 2% water vapor to a stoichiometric H2-O2 mixture increases the minimum detonation Mach number by 3% as predicted by theory. It is also found that the same amount of water vapor decreases the reaction length by approximately 50% and that the addition of 1% of water vapor to 50% hydrogen-50% oxygen mixtures reduces the reaction length by approximately 30%. The experimental work of Kistaikowsky and Kydd is found to support the latter findings. (Author)

AD-618 025 Div. 27/2, 9/7
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE USE OF A COANDA NOZZLE WITH PARALLEL SECONDARY INJECTION FOR THE THRUST VECTORING OF A TWO-DIMENSIONAL COMPRESSIBLE FLUID.
Masters's thesis,
by Philip P. Panzarella. Mar 65, 123p
Rept. no. GAM-65A/ME/65-7

Unclassified report

Descriptors: (*Secondary injection, Nozzles), (*Thrust vector control systems, Secondary injection), Compressible flow, Two-dimensional flow, Coanda effect, Jets, Pressure, Separation.

An experimental investigation was performed to determine the effect of parallel injection of a secondary fluid on a two-dimensional coanda-effect nozzle used as a thrust vectoring (jet-switching) device. The effect of leakage in the vortex area of a conventional coanda-effect nozzle utilizing perpendicular secondary injection was also determined. The injection of secondary fluid parallel to the centerline of the nozzle caused the primary jet to deflect toward the secondary jet and to attach to the nozzle sidewall nearest the secondary jet. A 1 to 10 decibel drop in the overall noise level resulted when the parallel secondary fluid was injected into the nozzle. Attachment of the primary jet to the nozzle was stable and was sustained by 'coanda-effect' flow in the separation region formed between the primary jet and the wall after secondary injection was discontinued. The wall attachment point was insensitive to increases in pressure ratio; however, the attachment point moved downstream along the nozzle wall as setback ratio increased from 4 to 7.

AD-618 026 Div. 21/4, 25/8
CFSTI Prices: HC$4.00 MF$1.00

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMBINED CONVECTION AND RADIATION IN

RADIOISOTOPE THRUSTORS,
Master's thesis,
by James A. Dibiase. Jun 65, 149p
Rept. no. GSP-65A/ME/65-1

Unclassified report

Descriptors: (*Heat transfer, Nuclear propulsion), (*Nuclear propulsion, Heat transfer), (*Radioactive isotopes, Nuclear propulsion), Thermal radiation, Thermal conductivity, Spacecraft nuclear propulsion, Hydrogen, Laminar flow, Programming(Computers).

Heat transfer by the combined effects of convection and radiation is investigated for radioisotope propulsion systems. Fully developed laminar flow is considered, with the transverse temperature profiles assumed to be the fully developed profiles for the local conditions. The governing equations are derived for non-insulated and insulated systems and the equations are solved numerically on an IBM 7094 computer. The assumptions used in the theoretical analysis are tested experimentally for the insulated case by simulating the radioisotope with a resistance heater and using hydrogen as a propellant. The theoretical and experimental data are compared for the range of flow rates tested. (Author)

AD-618 045 Div. 10/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CHEMISTRY AND TECHNOLOGY OF FUELS AND LUBRICANTS, VOL. 9, NO. 4, 1964 (SELECTED ARTICLES),
by N. Ya. Rudokova, B. K. Shermeta, T. A. Kvyatkovskaya, K. O. Averbakh, and O. K. Smirnov.
30 Jun 65, 22p Rept. no. FTD-TT-65-324
TT 65-62637

Unclassified report

Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v9 n4 p22-6, 66-9 1964.

Descriptors: (*Fuel additives, Surface-active substances), (*Surface-active substances, Fuel additives), (*Fuel oil, Purification), Hydrocarbons, Freezing, Ice, USSR, Chemistry, Solubility, Crystals, Distillation, Lubricants.

Contents: Enlarging the raw materials resources of paraffins on the bases of paraffinic crudes of the Ukraine, Methods of preventing the formation of ice crystals in fuels.

AD-618 068 Div. 27/2
CFSTI Prices: HC$2.00 MF$0.50

Air Force Aero Propulsion Lab., Air Force Systems Command, Wright-Patterson AFB, Ohio.
APPLYING THE METHOD OF CHARACTERISTICS TO ANALYZE THE FLOW FIELD OF A CHEMICALLY REACTING GAS IN A TWO-DIMENSIONAL OR AN AXI-SYMMETRIC NOZZLE,
by Roger R. Craig. Apr 65, 40p
Rept. no. APL-TR-65-20
Proj. 3012, Task 301201

Unclassified report

Descriptors: (*Supersonic nozzles, Gas flow), (*Ramjet engine nozzles, Design), Numerical methods and procedures, Programming(Computers), Two-dimensional flow, Axially symmetric flow, Recombination reactions, Partial differential equations, Difference equations, Numerical analysis, Integration, Nitrogen, Hydrogen, Oxides, Air.

The report discusses the difficulties encountered and their solutions in the development of the computer program for the two-dimensional and axisymmetric fields. Also, the mathematics used in the program are presented. The initial computer program was written for the simple chemical system $N_2O_4 + N_2$ reversibly yields $2NO_2 + N_2$. This system was chosen so that basic programming difficulties would not be concealed in a maze of chemical reactions. After completion, the program was modified to handle the combustion products of hydrogen and air and to compare the calculations with experimental data. Excellent agreement was obtained between the computed flow properties and the experimental data for the $N_2O_4 + N_2$ reversibly yields $2NO_2 + N_2$ system. Although some problems were encountered in the interpretation of the data, good agreement was obtained between the computed data and experimental data for the hydrogen-air system. (Author)

AD-618 107 Div. 10/7
CFSTI Prices: HC$1.00 MF$0.50

Michigan Univ., Ann Arbor. Aircraft Propulsion Lab.
THE INTERACTION PROCESS BETWEEN GASEOUS DETONATION WAVES AND INERT GASEOUS BOUNDARIES.
Final rept.,
by E. K. Dabora, J. A. Nicholls, and M. Sichel.
Jun 65, 11p Rept. no. 05170-3-F
Contract DA AROD31 124G345, Projs. 3559E, 05170
AROD 3559:3

Unclassified report

Descriptors: (*Detonation waves, Analysis), (*Explosive gases, Boundary layer), Propagation, Compressible flow, Detonations, Abstracting, Velocity, Hydrogen, Oxygen, Theory, Hydrodynamics.

The properties of gaseous detonation waves when subjected to a compressible (gaseous) inert boundary are investigated both theoretically and experimentally. Properties of interest are the propagation velocity, the reaction length, the quenching conditions and the shape of the wave. The zeroth order analytical solution of the hydrodynamic equations involved, an assessment of several quenching criteria, a description of the experimental setup, and the experimental results were obtained. As a summary of this work, the abstract and the conclusions are presented. (Author)

AD-618 200 Div. 10/4, 10/7
CFSTI Prices: HC$1.00 MF$0.50

Ohio State Univ. Research Foundation, Columbus.
FORMATION OF DETONATION WAVES IN FLOWING COMBUSTIBLE GASEOUS MIXTURES.
Final rept. for 1 Dec 62-31 Jan 65,
by Loren E. Bollinger, Gary C. Smith, Frederick J. Tomazic, and Rudolph Edse. 22 Apr 65, 11p
Rept. no. 1574
Grant AF AFOSR203 63, Proj. 9711, Task 971101
AFOSR 65-1051

Unclassified report

Descriptors: (*Fuels, Detonation waves), (*Detonation waves, Explosive gases), Methane, Oxygen, Hydrogen, Gas flow, Mixtures, Turbulence, Ignition, Flame propagation, Quenching(Inhibition).

Detonation induction distances were measured in hydrogen-oxygen and methane-oxygen mixtures flowing at various velocities through a 9 stainless steel tube, 9 mm inside diam. The linear flow velocities of the gas mixture ranged from 0-100 m/sec in hydrogen-oxygen mixtures. Some experiments were conducted at 5 atm initial pressure. Experiments with methane-oxygen mixtures were carried out at 1 atm only; the initial velocities of these mixtures ranged from 0-30 m/sec. It was found that the

formation of detonation waves in flowing combustible gaseous mixtures is dependent upon the initial pressure and the intensity of turbulence present in the gases. As the initial pressure is raised, the effect of turbulence becomes less pronounced. Higher turbulence levels cause an effective decrease in the quenching diam as indicated in these experiments. Higher flow rates for a methane-oxygen mixture (50 per cent fuel) insure positive ignition and positive measurement of flame propagation rates. (Author)

AD-618 647 Div. 27/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CENTRIPETAL GAS TURBINE,
by R. B. Abramovich, L. S. Arinuskhin, I. F. Vaynbaum, V. I. Dumov, and Yu. N. Mikhaylov.
14 Jul 65, 5p Rept. no. FTD-TT-65-198
TT 65-62711

Unclassified report

Unedited rough draft trans. of Russian patent 166555, pub 24 Jun 63, appl. 843067/24-6.

Descriptors: (*Gas turbines, Design), (*Gas turbine nozzles, Design), Rings, Gas turbine blades, Patents, USSR.

Object of the Invention: A centripetal gas turbine with a nozzle apparatus designed in the form of a ring with inclined bores which has the distinguishing feature that for the purpose of simplifying the technology of its production and lessening the noises in the nozzle place the bores are designed conical in the input and cylindrical in the output, so that the forward outflow edge of each preceding nozzle crosses the rear output edge of the following nozzle. (Author)

22. Space Technology

AD-618 028 Div. 12/6, 12/1, 25/3, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MAGNETOHYDRODYNAMIC EFFECTS ON SUPER-ORBITAL RE-ENTRY VEHICLES.
Master's thesis,
by Roger Clay Lewis. Jun 65, 89p
Rept. no. GSP-65B/ME/65-1
Unclassified report

Descriptors: (*Magnetohydrodynamics, Reentry vehicles), (*Reentry vehicles, Lift), (*Programming-(Computers), Atmosphere entry), Descent trajectories, Optimization, Magnetic fields, Drag, Stagnation point, Heat transfer.

The application of a magnetic field to a lifting re-entry vehicle wil change the stagnation point heat flux and will increase the drag over the nose. In addition, a vehicle weight increase is usually associated with the addition of the field generating equipment. A computer program was written to analyze these effects. At each point in the re-entry trajectory, the program calculates the optimum magnetic field which will minimize the heat flux. The heat flux to the stagnation point is computed using either the optimum magnetic field or a field of one Weber/sq m, whichever is smaller. A study was performed on the Sortie vehicle assuming a re-entry velocity of 35,000 ft/sec. The optimum field was always greater than one Weber/sq m. The influence of MHD on the maximum wall temperature was greatest at the minimum re-entry angle (10% decrease). For given conditions there is a critical weight increase for the vehicle at which the maximum wall temperature with MHD and the additional weight is equal to the maximum wall temperature without MHD and at the original weight. Results of this study indicate that MHD effects are in general small, and are significant only on vehicles with (weight)/(lift coefficient)(reference area)<100 lb/sq ft. (Author)

AD-618 030 Div. 12/6, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
ENVIRONMENTAL EFFECTS ON SPACE STRUCTURES.
Technical rept.,
by R. L. Keeney. Apr 64, 76p Rept. no. 6-74-64-17
Unclassified report

Descriptors: (*Space environment conditions, Spacecraft), (*Spacecraft, Space environmental conditions), Hazards, Vacuum, Radiation damage, Meteors, Penetration, Structures, Mathematical analysis, Materials, Plastics, Steel, Metals, Laminates.

This report presents current estimates of the nature and magnitude of environmental effects caused by space vacuum, radiation, and meteoric particles on spacecraft structures. Methods to counteract the deleterious effects of the space environment on spacecraft structures and their contents are discussed and preferable ones recommended. There are varying degrees of uncertainty concerning the various phases of space environment and the methods to meet these hazards. Space vacuum effects are well understood and do not appear to offer any serious problems except to exposed mechanisms. Radiation effects are well understood and are predictable for any given exposure. Future improvements can be expected in the definition of intensity and frequency of natural radiation sources. Improvements should be expected in the meteoric penetration theory, a laboratory confirmation of the tentative hydrodynamic penetration of Bjork would be welcome. A firmer definition of the velocities, densities, and mass-to-number distribution of the flux can be anticipated. Reduction of these uncertainties will place meteoroid penetration prediction on a firmer base. Protection systems may take a turn toward self-sealing systems in the future. (Author)

AD-618 234 Div. 12/6, 12/1, 15/1

University of Southern California, Los Angeles.
A MATHEMATICAL THEORY OF THE ORBITS ABOUT AN OBLATE PLANET.
Revised ed.,
by W. T. Kyner. 6 Jul 64, 37p
Contract Nonr22809, Proj. NR041 152
Unclassified report

Pub. in Journal of Social Industrial Applied Mathematics v13 n1 p136-71 Mar 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 15 May 63.

Descriptors: (*Celestial mechanics, Mathematics), (*Orbital trajectories, Celestial mechanics), Planets, Center of mass, Perturbation theory, Satellites-(Artificial).

AD-618 335 Div. 12/6, 12/2, 8/6, 25/3
CFST Prices: HC$3.00 MF$0.75

Case Inst. of Tech., Cleveland, Ohio.
ELECTROMAGNETIC ASPECTS OF THE RE-ENTRY PROBLEM USING A WARM PLASMA MODEL.
Scientific rept.,
by Norman C. Wenger. May 65, 97p Rept. no. SR-8
Contract AF19 628 1699, Proj. 5635, Task 56301
AFCRL 65-351
Unclassified report

Descriptors: (*Blackout(Electromagnetic), Atmosphere entry), (*Plasma sheath, Electromagnetic properties), (*Reentry vehicles, Plasma sheath), Mathematical models, Integral transforms, Magnetic fields, Electromagnetic waves, Temperature, Boundary value problems.

The electromagnetic properties of a model of a re-entry plasma layer are determined using the linearized hydrodynamic equations for a single fluid warm plasma medium. The model consists of a perfectly conducting plane of infinite extent, representing the surface of a space vehicle, covered by a warm plasma layer of uniform density. The total fields excited by a magnetic line source located on the conducting plane are computed by Fourier transform techniques. Expressions are obtained for the energy transported by the radiation field and by the waves guided along the plasma layer. Numerical results are presented showing the dependence of the energy transport on frequency and electron temperature. In addition, the radiation pattern of the far zone field is computed for various values of frequency and electron temperature. (Author)

AD-618 388 Div. 12/6, 12/1
CFSTI Prices: HC$2.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
VOSKHOD-1 AND VOSKHOD-2 FLIGHTS.
Surveys of Soviet-Bloc scientific and technical literature.
8 Jul 65, 32p Rept. no. ATD-P-65-46
TT 65-62671 Unclassified report

Descriptors: (*Space flight, USSR), Astronauts, Atmosphere entry, Training, Reviews, Manned spacecraft.

This review article is based on Soviet and Soviet-bloc open literature published in connection wit the manned flights of the Soviet Voskhod-1 and Voskhod-2 spacecraft. It describes the flights in detail, gives biographical sketches of the astronauts, and a few comments on the flights. The introduction gives a brief summary of the two flights and highlights their accomplishments.

AD-618 477 Div. 12/6, 12/1, 25/3
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
MAGNETIC MOMENT TESTING OF SATELLITES,
by Milton H. Lackey, Jr. 18 Jan 65, 35p
Rept. no. NOLTR-64-52

Unclassified report

Descriptors: (*Dipole moments, Satellites(Artificial)), (*Satellites(Artificial), Dipole moments), Magnetic moments, Tests, Simulation.

This report concerns procedures for determining the equivalent magnetic dipole of satellites. A bar magnet was used to simulate the magnetism of a satellite. Data was collected using present satellite test procedures. Results were plotted and compared with mathematically derived curves. Curves similar to these can be used in conjunction with certain test procedures to determine the equivalent magnetic dipole of satellites. (Author)

AD-618 571 Div. 12/6, 12/1

Massachusetts Inst. of Tech., Cambridge.
TIMING SCHEDULE OPTIMIZATION FOR EARTH ORBIT.
Master's thesis,
by John H. Fagan, Jr. and David W. Whitlow.
Jun 65, 149p Unclassified report
Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Optimization, Scheduling), (*Orbital trajectories, Time), Time studies, Programming-(Computers), Circular orbit trajectories, Operations research.

The location times of thirty measurement points for a spacecraft in a circular, planar earth orbit are varied to minimize a cost function, the sum of the squared components of position uncertainty, at a pre-determined target. In addition, the optimum schedule of horizon references for the star-elevation measurement to be used at each point is determined with respect to the same cost function. A steepest-descent computer program was written to perform the optimization in each case. It is shown that the measurement times collect into four clusters from a nominal schedule in which they are equally spaced. A cost reduction greater than 80% is realized. The horizon-selection procedure defines certain areas along the trajectory where one or the other horizon is preferred. When carried out simultaneously with a time optimization, this procedure results in only a slight improvement over the case where a single horizon is used for each measurement.

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field number. A typical subject index entry is shown below.

*COMBUSTION
OSCILLATION
INTENTIONAL COMBUSTION
OSCILLATIONS IN PROPULSION
SYSTEMS
AD-608 206 FLD. 25

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field numbers and titles are also listed. Again, three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*BENDAT, JULIUS S.
* * *
ZERO CROSSINGS OF A SINE
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AD-608 019 FLD. 15
* * *
SPECTRA AND AUTOCORRELATION
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AD-608 464 FLD. 2

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The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry (designated by an asterisk) for each document are listed the originator of the report, the originator's report number, the title, AD number, and field number. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parantheses directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

*SHEFFIELD UNIV (ENGLAND)
* * *
HIC 45
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS
(AFOSR 64 2029)
AD-608 206 FLD. 25

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C
* * *
64 2029
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS
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CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field number.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 500
LINCOLN LAB MASS INST OF TECH LEXINGTON
LL TR 365
(ESD TDR64 378)
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(ESD TDR64 566)
AD-608 288 FLD. 8

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UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
(AFOSR 69-1091)
AD-618 284 FLD. 20
(AFOSR 69-1092)
AD-618 285 FLD. 20
(AFOSR 69-1089)
AD-618 286 FLD. 4
(AFOSR 69-1093)
AD-618 188 FLD. 20
(AFOSR 69-1090)
AD-618 283 FLD. 20

•AF AFOSR62 288
MACKAY SCHOOL OF MINES UNIV OF NEVADA RENO
AD-618 430 FLD. 8

•AF AFOSR62 314
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS
(AFOSR 69-1099)
AD-618 080 FLD. 20

•AF AFOSR62 339
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
(AFOSR 69-0491)
F AD-617 986 FLD. 5

•AF AFOSR62 348
MASSACHUSETTS INST OF TECH CAMBRIDGE
(AFOSR 69-1009)
AD-618 620 FLD. 12

•AF AFOSR62 39
PENNSYLVANIA STATE UNIV UNIVERSITY PARK
(AFOSR 69-0877)
AD-618 356 FLD. 7

•AF AFOSR62 407
MASSACHUSETTS INST OF TECH CAMBRIDGE AEROPHYSICS LAB
(AFOSR 69-1191)
AD-618 579 FLD. 20

•AF AFOSR62 430
INSTITUTE OF GEOPHYSICS AND PLANETARY PHYSICS UNIV OF CALIFORNIA SAN DIEGO
AD-618 629 FLD. 8

•AF AFOSR62 5
NORTH CAROLINA UNIV CHAPEL HILL
AD-618 608 FLD. 5

•AF AFOSR646 64
MACKAY SCHOOL OF MINES UNIV OF NEVADA RENO
AD-618 425 FLD. 8

•AF AFOSR6824
LABORATORY FOR ELECTROSCIENCE RESEARCH NEW YORK UNIV N Y
(AFOSR 69-0992)
AD-617 959 FLD. 8

•AF AFOSR778 65
TEXAS UNIV AUSTIN DEPT OF CHEMISTRY
(AFOSR 69-0890)
AD-617 988 FLD. 20

•AF AFOSR99 63
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF CHEMISTRY
(AFOSR 69-0970)
F AD-617 927 FLD. 7

•AF EOAR24 64
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
(AFOSR 69-0760)
AD-618 392 FLD. 20

•AF EOAR29 64
STOCKHOLM UNIV (SWEDEN) PSYCHOLOGICAL LABS
(AFOSR 69-1303)
AD-618 289 FLD. 5
(AFOSR 69-1304)
AD-618 081 FLD. 5
(AFOSR 69-1305)
AD-618 133 FLD. 5

•AF EOAR6 64
STRATHCLYDE UNIV GLASGOW (SCOTLAND) DEPT OF MATHEMATICS
(AFOSR 69-1069)
F AD-618 296 FLD. 20

•AF EOAR61 44
GOTEBORG UNIV (SWEDEN)
(AFOSR 69-0943)
AD-617 981 FLD. 6

•AF EOAR62 14
KAROLINSKA INST STOCKHOLM (SWEDEN)
(AFOSR 69-0949)
AD-617 983 FLD. 6

•AF EOAR62 16
BRUSSELS UNIV (BELGIUM)
(AFOSR 69-1082)
AD-618 438 FLD. 20

•AF EOAR63 17
LEICESTER UNIV (ENGLAND)
(AFOSR 69-0997)
AD-617 990 FLD. 6

•AF EOAR63 28
GOTEBORG UNIV (SWEDEN) INST OF NEUROBIOLOGY
(AFOSR 69-0995)
AD-617 980 FLD. 6

•AF EOAR63 66
TECHNION -ISRAEL INST OF TECH HAIFA DEPT OF AERONAUTICAL ENGINEERING
(AFOSR 69-1008)
F AD-617 931 FLD. 1

•AF EOAR64 30
GOTEBORG UNIV (SWEDEN)
(AFOSR 65-0960)
AD-617 978 FLD. 6

•AF EOAR64 9
LUND UNIV (SWEDEN)
(AFOSR 65-0959)
AD-617 991 FLD. 6

•AF EOAR64 64
UPPSALA UNIV (SWEDEN)
(AFCRL 65-418)
F AD-618 962 FLD. 8

•AF EOAR64 65
MANCHESTER UNIV (ENGLAND)
DEPT OF MECHANICS OF FLUIDS
(AFOSR 65-1013)
F AD-618 309 FLD. 1

•AF04 611 9694
INSTITUTE OF RUBBER RESEARCH
UNIV OF AKRON OHIO
AD-618 228 FLD. 11

•AF04 694 870
ELECTRO-OPTICAL SYSTEMS INC
PASADENA CALIF
AD-617 934 FLD. 1

•AF04 695 469
AEROSPACE CORP EL SEGUNDO
CALIF
AD-618 021 FLD. 9

•AF19 604 4962
HARVARD COLL OBSERVATORY
CAMBRIDGE MASS
(AFCRL 65-247)
AD-618 001 FLD. 20

•AF19 604 5992
RESEARCH LAB OF ELECTRONICS
MASS INST OF TECH CAMBRIDGE
AD-617 999 FLD. 7

•AF19 604 7378
MASSACHUSETTS INST OF TECH
CAMBRIDGE DEPT OF GEOLOGY
AND GEOPHYSICS
(AFCRL 65-463)
F AD-618 209 FLD. 8

•AF19 604 7981
TENNESSEE UNIV KNOXVILLE
(AFCRL 65-260)
F AD-618 401 FLD. 7

•AF19 604 8371
LOWELL TECHNOLOGICAL INST
RESEARCH FOUNDATION MASS
(AFCRL 65-261)
F AD-618 309 FLD. 4

•AF19 628 1699
CASE INST OF TECH CLEVELAND
OHIO
(AFCRL 65-351)
AD-618 339 FLD. 22

•AF19 628 221
FLUID MECHANICS LAB MASS INST
OF TECH CAMBRIDGE
AD-618 299 FLD. 20

•AF19 628 2391
GEOSCIENCE INC CAMBRIDGE
MASS
(AFCRL 65-404)
AD-618 211 FLD. 20

•AF19 628 2392
AMERICAN SCIENCE AND ENGINEERING
INC CAMBRIDGE MASS
(AFCRL 65-3771)
AD-618 171 FLD. 4

•AF19 628 2406 GRANT
CRUFT LAB HARVARD UNIV CAMBRIDGE
MASS
(AFCRL 65-401)
AD-617 928 FLD. 9

•AF19 628 2410
SYLVANIA ELECTRONIC SYSTEMS
WALTHAM MASS APPLIED RESEARCH
LAB
(AFCRL 65-371)
AD-618 396 FLD. 9
(AFCRL 65-372)
AD-618 397 FLD. 9
(AFCRL 65-373)
AD-618 398 FLD. 17
(AFCRL 65-408)
AD-618 519 FLD. 20
(AFCRL 65-409)
AD-618 920 FLD. 20

•AF19 628 2464
ADCOLE CORP WALTHAM MASS
(AFCRL 65-417)
F AD-618 293 FLD. 14

•AF19 628 2789
SHELL DEVELOPMENT CO HOUSTON
TEX
(AFCRL 65-490)
F AD-618 400 FLD. 8

•AF19 628 2820 GRANT
UNIVERSITY OF WESTERN ONTARIO
LONDON DEPT OF PHYSICS
(AFOSR 65-1091)
AD-618 284 FLD. 20
(AFOSR 65-1092)
AD-618 285 FLD. 20
(AFOSR 65-1089)
AD-618 286 FLD. 4

•AF19 628 2869
SASKATCHEWAN UNIV SASKATOON
(AFCRL 64-440)
AD-617 996 FLD. 3

•AF19 628 3922
HARVARD COLL OBSERVATORY
CAMBRIDGE MASS
(AFCRL 65-247)
AD-618 001 FLD. 20

•AF19 628 3937
UNITED AIRCRAFT CORP EAST
HARTFORD CONN
(ESD TR-65-10)
AD-618 492 FLD. 4

•AF19 628 3968
COURANT INST OF MATHEMATICAL
SCIENCES NEW YORK UNIV
N Y
(AFCRL 65-343)
AD-618 268 FLD. 9

•AF19 628 4014 GRANT
IONOSPHERE RESEARCH LAB PENNSY
LVANIA STATE UNIV UNIVERSITY
PARK
(AFCRL 65-420)
AD-618 213 FLD. 4

•AF19 628 4018
MOTOROLA INC SCOTTSDALE ARIZ
MILITARY ELECTRONICS DIV
(AFCRL 65-354)
F AD-617 932 FLD. 9

•AF19 628 4036
CONTROLS FOR RADIATION INC
CAMBRIDGE MASS
(AFCRL 65-379)
F AD-618 304 FLD. 18

•AF19 628 4049
FRIEZ INSTRUMENT DIV BENDIX
CORP BALTIMORE MD
(AFCRL 65-458)
F AD-618 292 FLD. 4

•AF19 628 4911
CARSON LABS INC BRISTOL CONN
(AFCRL 65-493)
AD-617 961 FLD. 9

•AF19 628 4979
PLANNING RESEARCH CORP LOS
ANGELES CALIF INFORMATION
SYSTEMS DIV
(ESD TR-65-277)
AD-618 075 FLD. 13

•AF19 628 800
LINCOLN LAB MASS INST OF TECH
LEXINGTON
(ESD TDR-64-340)
AD-618 391 FLD. 5
(ESD TDR-65-262)
AD-618 392 FLD. 12
(ESD TDR-65-237)
AD-618 393 FLD. 9
AD-618 455 FLD. 20
(ESD TDR-65-93)
AD-618 503 FLD. 20
(ESD TDR-65-268)
AD-618 596 FLD. 20
(ESD TDR-65-308)
AD-618 597 FLD. 20
(ESD TDR-65-239)
AD-617 951 FLD. 9
(ESD TDR-65-234)
AD-618 017 FLD. 8

•AF19 628 9087
DUNLAP AND ASSOCIATES INC
DARIEN CONN
(ESD TR-65-275)
AD-618 311 FLD. 5

•AF29 601 6006
LOCKHEED MISSILES AND SPACE
CO SUNNYVALE CALIF
(WL TR-65-17)
AD-618 399 FLD. 20

•AF29 601 6002
NEW MEXICO UNIV ALBUQUERQUE
AIR FORCE SHOCK TUBE FACILITY
(WL TR-65-79)
F AD-618 069 FLD. 8

•AF29 601 6213
GENERAL DYNAMICS/FORT WORTH
TEX NUCLEAR AEROSPACE RESEARCH
FACILITY
(WL TR-65-90)
AD-618 040 FLD. 11
(WL TR-64-156)
AD-618 101 FLD. 4

•AF29 601 6316
BENDIX CORP SOUTHFIELD MICH
AD-618 194 FLD. 9

•AF29 601 6624
DIKEWOOD CORP ALBUQUERQUE
N MEX
(WL TR-64-179)
AD-617 969 FLD. 20

•AF29 601 6692
GENERAL ATOMIC DIV GENERAL
DYNAMICS CORP SAN DIEGO
CALIF
(WL TR-65-99)
F AD-618 073 FLD. 18

•AF30 602 2213
POLYTECHNIC INST OF BROOKLYN
N Y MICROWAVE RESEARCH INST
(RADC TR-65-289)
AD-618 276 FLD. 9

•AF30 602 2646
SYRACUSE UNIV N Y RESEARCH
INST
(RADC TR-65-101)
AD-618 039 FLD. 9

•AF30 602 2989
AIRBORNE INSTRUMENTS LAB
DEER PARK N Y
(RADC TR-65-198)
AD-618 909 FLD. 20

•AF30 602 3046
ELECTRICAL ENGINEERING RESEARCH

LAB UNIV OF ILLINOIS URBANA
(RADC TR-69-127)
AD-618 036 FLD. 9

•AF30 602 3288
HONEYWELL INC MINNEAPOLIS
MINN AERONAUTICAL DIV
(RADC TR-69-71)
F AD-618 969 FLD. 13

•AF30 602 3316
KEARFOTT DIV GENERAL PRECISION
INC LITTLE FALLS N J
(RADC TR-69-103)
F AD-618 900 FLD. 9

•AF30 602 3337
PHILCO BLUE BELL PA AERONUTRONIC
DIV
(RADC TR-69-19)
AD-618 102 FLD. 9

•AF30 602 3339
HUGHES AIRCRAFT CO FULLERTON
CALIF
(RADC TR-69-123)
F AD-618 399 FLD. 12

•AF30 602 3342
AIRBORNE INSTRUMENTS LAB
DEER PARK N Y
(RADC TR-69-21)
AD-618 902 FLD. 9

•AF30 602 3423
TEXAS INSTRUMENTS INC DALLAS
(RADC TR-69-74)
F AD-618 991 FLD. 9

•AF30 602 3918
RADIO CORP OF AMERICA CAMDEN
N J
(RADC TR-69-126)
F AD-618 970 FLD. 10

•AF30 639 11188
LENKURT ELECTRIC CO INC SAN
CARLOS CALIF
(RADC TDR-64-470 V1)
AD-618 917 FLD. 9
(RADC TDR-64-470 V2)
AD-618 924 FLD. 9

•AF33 619 1083
RESEARCH LAB OF ELECTRONICS
MASS INST OF TECH CAMBRIDGE
AD-618 071 FLD. 10

•AF33 619 1178
BARNER AND SHASEY CO FLUSHING
N Y
(ARL 69-92)
F AD-618 193 FLD. 20

•AF33 619 1747
MASSACHUSETTS INST OF TECH
CAMBRIDGE
AD-618 000 FLD. 6

•AF33 616 7312
RENSSELAER POLYTECHNIC INST
TROY N Y
(ARL 69-198)
AD-618 291 FLD. 20

•AF33 616 7372
ROCKETDYNE CANOGA PARK CALIF
R 6078 1
(ARL 69-116 P1)
F AD-618 915 FLD. 12
R 6078 2
(ARL 69-116 P2)
F AD-618 916 FLD. 12
R 6078 3
(ARL 69-116 P3)
F AD-618 917 FLD. 12
R 6078 4
(ARL 69-116 P4)
AD-618 918 FLD. 12

•AF33 616 8383
LABORATORY FOR INSULATION
RESEARCH MASS INST OF TECH
CAMBRIDGE
AD-618 909 FLD. 7

•AF33 616 8396
GEORGIA INST OF TECH ATLANTA
(ARL 69-96)
AD-618 100 FLD. 20
(ARL 69-97)
F AD-618 140 FLD. 20

•AF33 616 8483
CINCINNATI UNIV OHIO
(ARL 69-99)
AD-618 072 FLD. 14
(ARL 69-193)
AD-618 252 FLD. 1

•AF33 657 10399
SPACE AND INFORMATION SYSTEMS
DIV NORTH AMERICAN AVIATION
INC DOWNEY CALIF
SID 64 1912 3
(FDL TDR-64-192 P3)
AD-618 083 FLD. 1
SID 64 1912 1
(FDL TDR-64-192 P1)
AD-618 096 FLD. 1
SID 64 1912 2
(FDL TDR-64-192 P2)
AD-618 097 FLD. 1

•AF33 657 10972
WESTINGHOUSE DEFENSE AND SPACE
CENTER BALTIMORE MD AEROSPACE
DIV
AD-618 066 FLD. 20

•AF33 657 11737
PURDUE UNIV LAFAYETTE IND
AD-618 924 FLD. 12
AD-618 929 FLD. 12

•AF33 657 12297
PRODESCO INC PERKASIE PA•
(ML TR-64-413)
AD-617 930 FLD. 11

•AF33 657 7896
CUBIC CORP SAN DIEGO CALIF
(SEG TR-64-72)
AD-618 063 FLD. 8

•AF33 657 9161
MARTIN CO DENVER COLO
AD-618 069 FLD. 20

•AF33 657 9814
FROST ENGINEERING DEVELOPMENT
CORP DENVER COLO
(AMRL TR-69-109)
F AD-618 280 FLD. 6

•AF33 657 9809
RAYTHEON CO WALTHAM MASS
RESEARCH DIV
(ARL 69-99)
F AD-618 303 FLD. 11

•AF61 609 1886
NEW HAMPSHIRE UNIV DURHAM
(AAL TDR-64-11)
AD-618 933 FLD. 6

•AF49 638 1078
INSTITUTE OF SCIENCE AND TECH
UNIV OF MICHIGAN ANN ARBOR
AD-618 610 FLD. 8

•AF49 638 1108
AMOCO CHEMICALS CORP SEYMOUR
IND PROPELLANTS DIV
(AFOSR 69-1089)
F AD-617 941 FLD. 7

•AF49 638 1119
SOUTHWEST RESEARCH INST SAN
ANTONIO TEX DEPT OF MECHANICAL
SCIENCES
(AFOSR 69-1198)
AD-618 002 FLD. 20

•AF49 638 1137
OLIN MATHIESON CHEMICAL CORP
NEW HAVEN CONN CHEMICALS
DIV
(AFOSR 69-1090)
F AD-617 964 FLD. 7

•AF49 638 1170
ACOUSTICS AND SEISMICS LAB
UNIV OF MICHIGAN ANN ARBOR
AD-618 609 FLD. 8

•AF49 638 1202
UNITED TECHNOLOGY CENTER SUNNYVALE
CALIF
(AFOSR 69-1096)
F AD-617 938 FLD. 21

•AF49 638 1219
MIAMI UNIV CORAL GABLES FLA
(AFOSR 69-1024)
AD-618 939 FLD. 12

•AF49 638 1284
PLASMA LAB COLUMBIA UNIV
NEW YORK
AD-618 043 FLD. 20

•AF49 638 1279
CALIFORNIA INST OF TECH PASADENA
DIV OF CHEMISTRY AND CHEMICAL
ENGINEERING
AD-618 287 FLD. 20

•AF49 638 1304
JOHNS HOPKINS UNIV BALTIMORE
MD DEPT OF BIOPHYSICS
(AFOSR 69-0996)
AD-617 985 FLD. 6

•AF49 638 1306 GRANT
PRINCETON UNIV N J DEPT
OF AEROSPACE AND MECHANICAL
SCIENCES
(AFOSR 69-0983)
AD-618 088 FLD. 11

•AF49 638 1333
PALMER PHYSICAL LAB PRINCETON
UNIV N J
(AFOSR 69-1062)
AD-618 282 FLD. 20
(AFOSR 69-0841)
AD-618 920 FLD. 20

•AF49 638 1340
POLYTECHNIC INST OF BROOKLYN
N Y DEPT OF AEROSPACE ENGINEERING
AND APPLIED MECHANICS
(AFOSR 69-0984)
AD-618 306 FLD. 13
(AFOSR 69-0985)
AD-618 310 FLD. 20

•AF49 638 1389
INSTITUTE OF THEORETICAL PHYSICS
STANFORD UNIV CALIF
(AFOSR 69-1068)
AD-618 288 FLD. 20

•AF49 638 1464
MITHRAS INC CAMBRIDGE MASS
(AFOSR 69-0727)
AD-617 960 FLD. 20

•AF49 638 1477
NORTH AMERICAN AVIATION INC
LOS ANGELES CALIF
(AFOSR 69-0797)
AD-618 294 FLD. 1

•AF49 638 700
RAND CORP SANTA MONICA CALIF
AD-618 033 FLD. 19
AD-618 364 FLD. 19
AD-618 366 FLD. 20
AD-618 498 FLD. 9
AD-618 499 FLD. 20

•AF49 638 991 GRANT
PENNSYLVANIA UNIV PHILADELPHIA
AD-618 931 FLD. 9

•AF61 092 186
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
(AFCRL 69-429)
AD-618 242 FLD. 3

•AF61 092 402
SYSTEM RESEARCH LTD RICHMOND (ENGLAND)
(AFOSR 69-0983)
AD-618 003 FLD. 5

•AF61 092 489
GOTEBORG UNIV (SWEDEN)
(AFOSR 69-1030)
AD-617 929 FLD. 12

•AF61 092 490
INNSBRUCK UNIV (AUSTRIA)
(AFCRL 69-490)
AD-617 922 FLD. 8

•AF61 092 576
TECHNION -ISRAEL INST OF TECH HAIFA
(ARL 69-152)
AD-617 943 FLD. 20

•AF61 092 619
KIRUNA GEOPHYSICAL OBSERVATORY (SWEDEN)
(AFCRL 69-388)
AD-618 336 FLD. 20

•AF61 092 640
SYSTEM RESEARCH LTD RICHMOND (ENGLAND)
(AFOSR 69-0583)
AD-618 003 FLD. 5

•AF61 092 697
INSTITUTO GEOGRAFICO Y CATASTRAL MADRID (SPAIN)
AD-618 611 FLD. 8

•AF61 092 679
INNSBRUCK UNIV (AUSTRIA)
(AFOSR 69-1314)
AD-618 138 FLD. 20

•AF61 092 720
CONSIGLIO NAZIONALE DELLE RICERCHE FLORENCE (ITALY) CENTRO DI STUDIO PER LA
(AFCRL 69-481)
F AD-618 468 FLD. 20

•AF61 092 749
OSLO UNIV (NORWAY) DEPT OF ASTROPHYSICS
(AFCRL 69-363)
AD-618 222 FLD. 3

•AF61 092 749
CONSEJO SUPERIOR DE IVESTIGACIONES CIENTIFICAS BARCELONA (SPAIN) DEPARTAMENTO DE QUIMICA
(ARL 69-161)
F AD-618 042 FLD. 7

•AF61 092 780
QUEEN'S UNIV BELFAST (NORTHERN IRELAND) DEPT OF APPLIED MATHEMATICS
(AFCRL 69-267)
AD-618 139 FLD. 18

•AF61 092 781
UNIVERSITY COLL LONDON (ENGLAND)
(AFCRL 69-432)
AD-618 301 FLD. 4

•AF61 514 949
REITER (REINHOLD) (GERMANY)
(AFCRC TN-58-645 V1)
AD-618 307 FLD. 4
(AFCRC TN-58-645 V2)
AD-618 308 FLD. 4

•AM08825
WASHINGTON UNIV SEATTLE
AD-618 905 FLD. 6

•AM07803 02
WASHINGTON UNIV SEATTLE
AD-618 907 FLD. 6

•AT11 1 209
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
AD-618 601 FLD. 6

•AT30 1 2098 GRANT
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
(AFOSR 69-0760)
AD-618 392 FLD. 20

•AT40 1 2911
MARINE LAB UNIV OF MIAMI CORAL GABLES FLA
AD-618 999 FLD. 8

•A99 638 700
RAND CORP SANTA MONICA CALIF
AD-618 369 FLD. 19

•B SR652
LEICESTER UNIV (ENGLAND)
(AFOSR 69-0997)
AD-617 990 FLD. 6

•DA ARO031 1246948
MICHIGAN UNIV ANN ARBOR AIRCRAFT PROPULSION LAB
(AROD 355913)
F AD-618 107 FLD. 21

•DA ARO031 1246928
DUKE UNIV DURHAM N C
(AROD 413119)
AD-618 434 FLD. 6
(AROD 413118)
AD-618 435 FLD. 6

•DA ARO031 1246987
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
(AROD 428414)
AD-618 326 FLD. 20

•DA ARO031 1246911
CALIFORNIA UNIV RIVERSIDE DEPT OF CHEMISTRY
(AROD 471912)
AD-617 986 FLD. 7

•DA ARO49 092 69636
UNIVERSIDAD NACIONAL DE CUYO SAN CARLOS DE BARILOCHE (ARGENTINA) INSTITUTO DE
A AD-618 291 FLD. 11

•DA ARO49 092 69639
INSTITUTO DE INVESTIGACION AERONAUTICA Y ESPACIAL BUENOS AIRES (ARGENTINA)
A AD-617 942 FLD. 20

•DA18 001AMC8141
GENERAL ELECTRIC CO SCHENECTADY N Y ADVANCED TECHNOLOGY LABS
AD-618 082 FLD. 6

•DA18 039AMC292A
HELPAR INC FALLS CHURCH VA
F AD-618 472 FLD. 6

•DA18 108 908CML867A
INSTITUTE OF CONTEMPORARY RUSSIAN STUDIES FORDHAM UNIV NEW YORK
(TT 69-62679)
AD-618 569 FLD. 6

•DA19 020AMC00399W
PROFESSIONAL DESIGN CO AGAWAM MASS
F AD-618 084 FLD. 19

•DA19 020ORD9284 GRANT
YALE UNIV NEW HAVEN CONN
AD-618 933 FLD. 12

•DA19 020ORD9704A
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF METALLURGY
A AD-618 413 FLD. 11

•DA19 129QM1922N
MONSANTO RESEARCH CORP EVERETT MASS
(USA-NLABS FD-7)
F AD-617 963 FLD. 6

•DA19 129QM272
PSYCHOMETRIC LAB UNIV OF CHICAGO ILL
(DSSC P-1101-2)
AD-617 919 FLD. 5
(DSSC P-1101-3)
AD-617 920 FLD. 5
(DSSC P-1101-5)
AD-617 921 FLD. 5

•DA28 017AMC9798A
SYSTEMS MANAGEMENT AND ENGINEERING DEPT FAIRCHILD SPACE AND DEFENSE SYSTEMS SYOSSET
AD-618 934 FLD. 19

•DA28 043AMC00072E
COORDINATED SCIENCE LAB UNIV OF ILLINOIS URBANA
AD-618 329 FLD. 9
AD-618 328 FLD. 1
AD-618 332 FLD. 9

•DA28 043AMC00072E GRANT
COORDINATED SCIENCE LAB UNIV OF ILLINOIS URBANA
AD-618 331 FLD. 9
AD-618 333 FLD. 9

•DA28 043AMC00194E
SPECTRA-PHYSICS INC MOUNTAIN VIEW CALIF
AD-618 106 FLD. 20

•DA28 043AMC00221E
EAGLE-PICHER CO JOPLIN MO COUPLES DEPT
AD-618 497 FLD. 10

•DA28 043AMC00239E
KORAD CORP SANTA MONICA CALIF
AD-618 464 FLD. 20

•DA28 043AMC00390E
VARIAN ASSOCIATES BEVERLY MASS
AD-618 109 FLD. 9

•DA28 043AMC00418E
HUGHES AIRCRAFT CO NEWPORT BEACH CALIF MICROELECTRONICS DIV
AD-618 078 FLD. 18

•DA28 043AMC00423E
VENTURA DIV NORTHROP CORP VAN NUYS CALIF
NVR 3840
(ECOM 00423 1)
AD-618 079 FLD. 18

•DA28 043AMC00466E
CITY COLL RESEARCH FOUNDATION NEW YORK
AD-618 218 FLD. 9

•DA29 193MD2420 GRANT
WASHINGTON UNIV SEATTLE
AD-618 909 FLD. 6

•DA31 124ARO D218
RESEARCH AND ADVANCED DEVELOPMENT DIV AVCO CORP WILMINGTON MASS
(AROD 913616)
AD-618 074 FLD. 1

•DA31 124ARO D299
MICHIGAN UNIV ANN ARBOR

AIRCRAFT PROPULSION LAB
(AROD 5209.1)
AD-617 962 FLD. 21

•DA31 124ARO 033
FIRESTONE FLIGHT SCIENCES LAB CALIF INST OF TECH PASADENA
AD-618 343 FLD. 20
AD-618 344 FLD. 20

•DA31 124ARO 084 GRANT
POLYTECHNIC INST OF BROOKLYN N Y
(AROD 2428.17)
AD-618 616 FLD. 12

•DA31 124ARO 089
RCA LABS DIV RADIO CORP OF AMERICA PRINCETON N J
(AROD 4017.19)
AD-618 618 FLD. 20

•DA31 124AROD204
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
(AROD 247.66)
F AD-617 911 FLD. 12

•DA36 039ORD3722RD
ASTROMECHANICS RESEARCH DIV GIANNINI CONTROLS CORP MALVERN PA
AD-618 103 FLD. 20

•DA36 039AMC01468E
SPRAGUE ELECTRIC CO NORTH ADAMS MASS
AD-618 055 FLD. 9

•DA36 039AMC02168E
RENSSELAER POLYTECHNIC INST TROY N Y
AD-618 994 FLD. 20
AD-618 995 FLD. 20

•DA36 039AMC02204E
STANFORD RESEARCH INST MENLO PARK CALIF
F AD-617 998 FLD. 9

•DA36 039AMC02232E
GENERAL ELECTRIC CO LYNCHBURG VA COMMUNICATION PRODUCTS DEPT
AD-618 988 FLD. 9

•DA36 039AMC02368E
TRG INC MELVILLE N Y
AD-618 412 FLD. 9

•DA36 039AMC03186E
STELMA INC STAMFORD CONN
AD-618 141 FLD. 9

•DA36 039AMC03200E
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-617 992 FLD. 9
AD-617 994 FLD. 9
AD-617 997 FLD. 20
AD-617 998 FLD. 20
AD-618 237 FLD. 9
MASSACHUSETTS INST OF TECH CAMBRIDGE
AD-618 000 FLD. 6
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-617 999 FLD. 7

•DA36 039AMC03200E GRANT
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-618 340 FLD. 9
AD-618 341 FLD. 9
AD-618 349 FLD. 6
SPECTROSCOPY LAB MASS INST OF TECH CAMBRIDGE
AD-617 993 FLD. 20

•DA36 039AMC03247E
STANFORD RESEARCH INST MENLO PARK CALIF
AD-618 967 FLD. 9

•DA36 039AMC03639E
BULOVA WATCH CO WOODSIDE N Y ELECTRONICS DIV
AD-617 912 FLD. 9

•DA36 039AMC03636E
SYSTEMS INC ORLANDO FLA
AD-618 104 FLD. 9

•DA36 039AMC03640E
BLILEY ELECTRIC CO ERIE PA
AD-618 490 FLD. 9

•DA36 039SC81269
MCCOY ELECTRONICS CO MOUNT HOLLY SPRINGS PA
F AD-617 959 FLD. 9

•DA36 039SC90889
STANFORD RESEARCH INST MENLO PARK CALIF
AD-618 330 FLD. 20
AD-618 329 FLD. 17

•DA99 009AMC397T
HOLMAN (JOHN F) CO INC WASHINGTON D C
(AERDL T-1799X-691)
AD-618 671 FLD. 8

•DA99 009AMC397T
FARADAY TRANSLATIONS NEW YORK
(AERDL T-1799A-691)
AD-618 665 FLD. 8
(AERDL T-1799B-691)
AD-618 667 FLD. 8
(AERDL T-1799C-691)
AD-618 668 FLD. 8
(AERDL T-1799D-691)
AD-618 669 FLD. 8
(AERDL T-1799E-691)
AD-618 670 FLD. 8

•DA99 009AMC990T
HOLMAN (JOHN F) CO INC WASHINGTON D C
(AERDL T-1793-691)
AD-618 666 FLD. 3

•DA99 177AMC116T
AVIATION SAFETY ENGINEERING AND RESEARCH PHOENIX ARIZ
(USAAML TR-69-30)
AD-618 993 FLD. 1

•DA99 177AMC190T
LOCKHEED-CALIFORNIA CO BURBANK CALIF
(USAAML TR-69-29)
F AD-617 966 FLD. 1

•DA99 196X220B
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
AD-618 348 FLD. 4

•DA99 1860RD1086
SHOCKLEY TRANSISTOR DIV CLEVITE TRANSISTOR PALO ALTO CALIF
F AD-618 496 FLD. 9

•DA99 193MD2022
WESTERN RESERVE UNIV CLEVELAND OHIO SCHOOL OF MEDICINE
A AD-618 114 FLD. 6

•DA99 193MD2138
STANFORD MEDICAL CENTER PALO ALTO CALIF
AD-618 108 FLD. 6
AD-618 109 FLD. 6

•DA99 193MD2238
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
AD-618 911 FLD. 6

•DA99 193MD2281
IIT RESEARCH INST CHICAGO ILL
AD-618 489 FLD. 6

•DA99 193MD2341 GRANT
CHICAGO UNIV ILL MEDICAL SCHOOL
AD-618 612 FLD. 6
AD-618 613 FLD. 6
AD-618 614 FLD. 6

•DA99 193MD2420
WASHINGTON UNIV SEATTLE
A AD-618 504 FLD. 6

•DA99 193MD2420 GRANT
WASHINGTON UNIV SEATTLE
AD-618 909 FLD. 6
AD-618 907 FLD. 6
AD-618 908 FLD. 6
AD-618 910 FLD. 6
AD-618 627 FLD. 6

•DA99 193MD2497 GRANT
MINNESOTA UNIV MINNEAPOLIS DEPT OF OPHTHALMOLOGY
AD-618 974 FLD. 6

•DBRP480 19
LOYOLA COLL MONTREAL (QUEBEC) DEPT OF CHEMISTRY
AD-618 123 FLD. 7

•DBR9930 20
MCGILL UNIV MONTREAL (QUEBEC) INORGANIC CHEMISTRY LAB
AD-617 976 FLD. 7

•DRB6801 23
ALBERTA UNIV EDMONTON DEPT OF ENTOMOLOGY
AD-617 977 FLD. 6

•DRB9388 16
CITIES SERVICE ATHABASCA INC EDMONTON (ALBERTA)
AD-618 121 FLD. 11

•DRB9910 21
ROYAL MILITARY COLL OF CANADA KINGSTON (ONTARIO)
AD-618 977 FLD. 20

•DRB9911 98
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
AD-618 629 FLD. 4

•DRB9938 16
ALBERTA UNIV EDMONTON DEPT OF MINING AND METALLURGY
AD-618 120 FLD. 11

•DR82871 7
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
AD-618 269 FLD. 6

•E201
ARMED FORCES INST OF PATHOLOGY ARMY MEDICAL CENTER WASHINGTON D C
AD-618 176 FLD. 6
AD-618 177 FLD. 6

•FA 8A4289
LING-TEMCO-VOUGHT INC DALLAS TEX MILITARY ELECTRONICS DIV
(SRDS RD-69-119)
F AD-617 933 FLD. 9

•FA 8A4909
BOLT BERANEK AND NEWMAN INC LOS ANGELES CALIF
BBN 1093 VOL. 1
(SRDS RD-69-148 V1)
AD-618 190 FLD. 1
BBN 1093 VOL. 2
(SRDS RD-69-148 V2)
AD-618 191 FLD. 1

BBN 1093
AD-618 192 FLD. 1

•FA WA4486
OXFORD CORP BUFFALO N Y
(SRDS 69-31)
F AD-618 298 FLD. 1

•FA WA4524
RAYTHEON CO WAYLAND MASS
(SRDS RD-69-29)
F AD-618 476 FLD. 9

•FA WA4693
BURROUGHS CORP PAOLI PA
(SRDS RD-69-128)
F AD-618 029 FLD. 17

•FAA ARD5933
SYRACUSE UNIV RESEARCH CORP
NY DEFENSE SYSTEMS LAB
(SRDS RD-69-28)
F AD-618 921 FLD. 17

•FA69WA4920
BOEING CO RENTON WASH AIRPLANE
DIV
(FAA-ADS 31)
F AD-617 936 FLD. 21

•FA69WA4991
BOLT BERANEK AND NEWMAN INC
CAMBRIDGE MASS
(FAA-ADS 42)
AD-617 939 FLD. 1

•FA69WA5060
OHIO UNIV ATHENS DEPT OF
ELECTRICAL ENGINEERING
EER 9 1
(SRDS RD69 30)
F AD-618 085 FLD. 1

•GP3908
LEHIGH UNIV BETHLEHEM PA
MARINE SCIENCE CENTER
AD-618 295 FLD. 8

•GRANT AM07803
WASHINGTON UNIV SEATTLE
AD-618 906 FLD. 6

•NASA NGR09 002 028
MONTANA STATE COLL BOZEMAN
(N69 33125)
AD-618 231 FLD. 3

•NIG NB04382 01
INSTITUTO DE NEUROLOGIA MONTEVIDEO
(URUGUAY)
(AFOSR 69-0966)
AD-618 260 FLD. 6

•NIH AM04066
CHILDREN'S HOSPITAL WASHINGTON
D C BIOCHEMICAL RESEARCH
LAB
AD-617 979 FLD. 6

•NIH B1979
MINNESOTA UNIV MINNEAPOLIS
DEPT OF OPHTHALMOLOGY
AD-618 574 FLD. 6

•NIH HD00409 02
WASHINGTON UNIV SEATTLE
AD-618 627 FLD. 6

•NIH M1849
NORTH CAROLINA UNIV CHAPEL
HILL
AD-618 608 FLD. 9

•NIH 26949
POMONA COLL CLAREMONT CALIF
DEPT OF PHYSICS
AD-618 241 FLD. 6

•NOBSR89324
GENERAL ELECTRIC CO SYRACUSE
N Y ELECTRONICS LAB
AD-618 099 FLD. 17

•NOBS90268
OCEANICS INC PLAINVIEW N
Y
AD-618 528 FLD. 13

•NOBS90387
NEW YORK UNIV N Y SCHOOL
OF ENGINEERING AND SCIENCE
AD-618 290 FLD. 11

•NONR 60000668
BEAVER COLL GLENSIDE PA
AD-618 076 FLD. 9

•NONR110024
PURDUE UNIV LAFAYETTE IND
SCHOOL OF ELECTRICAL ENGINEERING
F AD-618 473 FLD. 20

•NONR110026
PURDUE UNIV LAFAYETTE IND
AD-618 528 FLD. 12
AD-618 529 FLD. 12
AD-618 530 FLD. 12

•NONR113801
ARCTIC INST OF NORTH AMERICA
WASHINGTON D C
AD-618 603 FLD. 6

•NONR114707
COLORADO UNIV BOULDER
AD-617 924 FLD. 9

•NONR120224
WISCONSIN UNIV MADISON
AD-617 926 FLD. 9

•NONR122447
MICHIGAN UNIV ANN ARBOR
COLL OF ENGINEERING
AD-617 940 FLD. 11

•NONR140607
ILLINOIS INST OF TECH CHICAGO
S AD-618 132 FLD. 11

•NONR170502
INDIANA UNIV BLOOMINGTON
AD-618 342 FLD. 20

•NONR183437
ILLINOIS UNIV URBANA COLL
OF VETERINARY MEDICINE
AD-618 622 FLD. 6

•NONR184110
LABORATORY FOR INSULATION
RESEARCH MASS INST OF TECH
CAMBRIDGE
AD-618 409 FLD. 7

•NONR184188
ELECTRONIC SYSTEMS LAB MASS
INST OF TECH CAMBRIDGE
AD-618 124 FLD. 20

•NONR184187
MASSACUSETTS INST OF TECH
CAMBRIDGE OPERATIONS RESEARCH
CENTER
AD-618 406 FLD. 12

•NONR184193
FLUID MECHANICS LAB MASS INST
OF TECH CAMBRIDGE
AD-618 219 FLD. 20
AD-618 220 FLD. 20
MASSACHUSETTS INST OF TECH
CAMBRIDGE DEPT OF MECHANICAL
ENGINEERING
AD-618 598 FLD. 20

•NONR186616
CRUFT LAB HARVARD UNIV CAMBRIDGE
MASS
AD-618 410 FLD. 20

•NONR186632
CRUFT LAB HARVARD UNIV CAMBRIDGE
MASS
AD-618 229 FLD. 9

•NONR186637
HARVARD UNIV CAMBRIDGE MASS
AD-618 183 FLD. 6
AD-618 184 FLD. 12
AD-618 185 FLD. 12
AD-618 186 FLD. 12

•NONR21194
TEXAS A AND M UNIV COLLEGE
STATION DEPT OF OCEANOGRAPHY
AND METEOROLOGY
AD-618 479 FLD. 8

•NONR212126
CHICAGO UNIV ILL FLUID DYNAMICS
AND SEDIMENT TRANSPORT LAB
AD-618 052 FLD. 8

•NONR214902
VANDERBILT UNIV NASHVILLE
TENN
AD-618 230 FLD. 5

•NONR219600
WOODS HOLE OCEANOGRAPHIC INSTI
TUTION MASS
AD-618 039 FLD. 8
AD-618 089 FLD. 8

•NONR22038
HYDRODYNAMICS LAB CALIF INST
OF TECH PASADENA
AD-618 511 FLD. 20

•NONR22040
CALIFORNIA INST OF TECH PASADENA
DIV OF CHEMISTRY AND CHEMICAL
ENGINEERING
AD-618 287 FLD. 20

•NONR22047 GRANT
MONTANA STATE COLL BOZEMAN
(N69 33125)
AD-618 231 FLD. 3

•NONR221611 GRANT
CALIFORNIA UNIV LA JOLLA
AD-618 203 FLD. 20

•NONR22393
INSTITUTE OF ENGINEERING RESEARCH
UNIV OF CALIFORNIA BERKELEY
AD-618 418 FLD. 13

•NONR22937
COMPUTER SCIENCE DIV STANFORD
UNIV CALIF
AD-618 214 FLD. 12
(TT 69-62694)
AD-618 216 FLD. 12
STANFORD UNIV CALIF SCHOOL
OF HUMANITIES AND SCIENCES
AD-618 215 FLD. 20
AD-618 217 FLD. 12

•NONR22990
INSTITUTE FOR MATHEMATICAL
STUDIES IN TH
AD-618 404 FLD. 5
AD-618 405 FLD. 5

•NONR22992
APPLIED MATHEMATICS AND STATISTICS
LABS STANFORD UNIV CALIF
AD-617 939 FLD. 12

•NONR22998
STANFORD UNIV CALIF DEPT
OF PHYSICS
F AD-618 487 FLD. 20

•NONR22960
STANFORD UNIV CALIF DEPT
OF MATERIALS SCIENCE
AD-618 202 FLD. 11

•NONR22967
HIGH ENERGY PHYSICS LAB STANFORD
UNIV CALIF
AD-618 488 FLD. 20

AD-618 657 FLD. 20
AD-618 658 FLD. 20
AD-618 659 FLD. 20
AD-618 660 FLD. 20
AD-618 661 FLD. 20
AD-618 662 FLD. 20
AD-618 663 FLD. 20
AD-618 664 FLD. 20

*NONR22977
STANFORD UNIV CALIF DEPT OF INDUSTRIAL ENGINEERING
AD-618 908 FLD. 13

*NONR22980
STANFORD UNIV CALIF DEPT OF STATISTICS
AD-617 937 FLD. 12

*NONR22649
COLUMBIA RADIATION LAB NEW YORK
AD-618 937 FLD. 20

*NONR22809
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES
AD-618 239 FLD. 22

*NONR23379
CALIFORNIA UNIV LOS ANGELES GRADUATE SCHOOL OF BUSINESS ADMINISTRATION
AD-618 278 FLD. 5
AD-618 279 FLD. 12
CALIFORNIA UNIV LOS ANGELES WESTERN MANAGEMENT SCIENCE INST
AD-618 377 FLD. 5
AD-618 378 FLD. 5
AD-618 379 FLD. 5

*NONR234200
FRANKLIN INST RESEARCH LABS PHILADELPHIA PA
AD-618 210 FLD. 13

*NONR243901
CHARLESTON COLL S C
AD-618 269 FLD. 6

*NONR258200 GRANT
MINNESOTA UNIV MINNEAPOLIS
AD-618 189 FLD. 12

*NONR26604
CORNELL UNIV ITHACA N Y
AD-618 269 FLD. 12

*NONR26676 GRANT
COLUMBIA UNIV NEW YORK COLL OF PHYSICIANS AND SURGEONS
AD-618 269 FLD. 6

*NONR278400
GENERAL ATOMIC DIV GENERAL DYNAMICS CORP SAN DIEGO CALIF
AD-618 937 FLD. 20

*NONR279403
ARIZONA STATE UNIV TEMPE
AD-618 115 FLD. 5
AD-618 116 FLD. 5
AD-618 117 FLD. 5

*NONR310400
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
AD-618 601 FLD. 6

*NONR324300
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
AD-618 989 FLD. 8

*NONR333102
NEW MEXICO STATE UNIV UNIVERSITY PARK RESEARCH CENTER
AD-618 223 FLD. 20

*NONR337902
DEFENSE RESEARCH LAB UNIV OF TEXAS AUSTIN
AD-618 602 FLD. 17

*NONR339000
WESTERN BEHAVIORAL SCIENCES INST LA JOLLA CALIF
F AD-618 302 FLD. 5

*NONR339900
MIDWEST RESEARCH INST KANSAS CITY MO
AD-618 966 FLD. 14

*NONR342502
FLUID MECHANICS LAB MASS INST OF TECH CAMBRIDGE
AD-618 299 FLD. 20

*NONR349612 GRANT
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES SCHOOL OF MEDICINE
AD-618 232 FLD. 6

*NONR349618
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
AD-618 112 FLD. 12

*NONR372800
VIDYA DIV ITEK CORP PALO ALTO CALIF
F AD-617 929 FLD. 1

*NONR393400
VIDYA DIV ITEK CORP PALO ALTO CALIF
AD-618 919 FLD. 13

*NONR39612
RHODE ISLAND UNIV KINGSTON DEPT OF ELECTRICAL ENGINEERING
AD-618 113 FLD. 9

*NONR399601
ARCTIC INST OF NORTH AMERICA WASHINGTON D C
AD-618 609 FLD. 8
AD-618 609 FLD. 8

*NONR400802
MARINE LAB UNIV OF MIAMI CORAL GABLES FLA
AD-618 599 FLD. 8

*NONR401007 GRANT
JOHNS HOPKINS UNIV BALTIMORE MD
AD-618 941 FLD. 6

*NONR40146 GRANT
CORNELL UNIV ITHACA N Y
AD-618 932 FLD. 20

*NONR402800 GRANT
POMONA COLL CLAREMONT CALIF DEPT OF PHYSICS
AD-618 241 FLD. 6

*NONR402900
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
AD-618 607 FLD. 17
AD-618 989 FLD. 8

*NONR407600
HONEYWELL RESEARCH CENTER HOPKINS MINN
AD-618 212 FLD. 20

*NONR410602
NORTHEASTERN UNIV BOSTON MASS
F AD-618 297 FLD. 20

*NONR419300
TRACOR INC AUSTIN TEX
F AD-617 967 FLD. 6

*NONR422201
GM DEFENSE RESEARCH LABS SANTA BARBARA CALIF
AD-618 223 FLD. 7

*NONR434300
NEW YORK STATE UNIV BUFFALO SCHOOL OF MEDICINE
AD-618 600 FLD. 6

*NONR437400
NEW YORK STATE UNIV BUFFALO
AD-618 086 FLD. 12

*NONR47710
WASHINGTON UNIV SEATTLE
AD-618 907 FLD. 8

*NONR47718
WASHINGTON UNIV SEATTLE
AD-618 134 FLD. 12

*NONR47737
WASHINGTON UNIV SEATTLE
AD-618 907 FLD. 8

*NONR477300
LINDE DIV UNION CARBIDE CORP INDIANAPOLIS IND
F AD-617 957 FLD. 20

*NONR59134
PENNSYLVANIA UNIV PHILADELPHIA
AD-618 038 FLD. 7
AD-618 087 FLD. 20

*NONR60236
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
AD-618 092 FLD. 20

*NONR60109
RENSSELAER POLYTECHNIC INST TROY N Y
AD-618 236 FLD. 20

*NONR61009
CHARLESTON COLL S C
AD-618 269 FLD. 6
LEHIGH UNIV BETHLEHEM PA
AD-618 187 FLD. 6

*NONR61007 GRANT
LEHIGH UNIV BETHLEHEM PA MARINE SCIENCE CENTER
AD-618 298 FLD. 8

*NONR71061
MINNESOTA UNIV MINNEAPOLIS DEPT OF ELECTRICAL ENGINEERING
AD-618 632 FLD. 20
AD-618 633 FLD. 20

*NONR88804
NORTH CAROLINA UNIV CHAPEL HILL
AD-618 239 FLD. 9

*NONR96904
NEW YORK STATE UNIV BUFFALO SCHOOL OF MEDICINE
AD-618 600 FLD. 6

*NOW62 02096
ORDNANCE RESEARCH LAB PENNSYLVANIA STATE UNIV UNIVERSITY PARK
AD-618 986 FLD. 20

*NOW62 02196
LTV VOUGHT AERONAUTICS DIV LING-TEMCO-VOUGHT INC DALLAS TEX
F AD-618 927 FLD. 1

*NOW62 02396
ORDNANCE RESEARCH LAB PENNSYLVANIA STATE UNIV UNIVERSITY PARK
AD-618 986 FLD. 20

*NOW62 02396
SHELL OIL CO WOOD RIVER ILL RESEARCH LAB
AD-618 922 FLD. 11

*NSF GK36

COORDINATED SCIENCE LAB UNIV OF ILLINOIS URBANA
AD-618 331 FLD. 9
AD-618 332 FLD. 9

•NSF GP169
POLYTECHNIC INST OF BROOKLYN N Y
(AROD 2428-17)
AD-618 616 FLD. 12

•NSF GP2310
PITTSBURGH UNIV PA COMPUTATION AND DATA PROCESSING CENTER
AD-618 077 FLD. 9

•NSF GP2498
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-618 340 FLD. 9
AD-618 341 FLD. 9
AD-618 345 FLD. 6

•NSF GP879
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
(AFOSR 65-0982)
AD-618 088 FLD. 11

•NSF GP896
IONOSPHERE RESEARCH LAB PENNSYLVANIA STATE UNIV UNIVERSITY PARK
(AFCRL 65-420)
AD-618 213 FLD. 4

•NSF GP891
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
(AFCRL 65-401)
AD-617 928 FLD. 9

•NSF G11309
PITTSBURGH UNIV PA
(AFOSR 65-0807)
AD-618 004 FLD. 20

•NSF G13226
CALIFORNIA UNIV LOS ANGELES
AD-618 281 FLD. 9

•NSF G14096
PENNSYLVANIA UNIV PHILADELPHIA
AD-618 931 FLD. 9

•NSF G14832
MINNESOTA UNIV MINNEAPOLIS
AD-618 189 FLD. 12

•NSF G19968
YALE UNIV NEW HAVEN CONN
AD-618 933 FLD. 12

•NSF G19637
SPECTROSCOPY LAB MASS INST OF TECH CAMBRIDGE
AD-617 993 FLD. 20

•NSF G19830
CALIFORNIA UNIV LOS ANGELES
AD-618 281 FLD. 9

•NSF G19884
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
(AFOSR 65-1041)
AD-618 619 FLD. 12

•NSF G19911
CORNELL UNIV ITHACA N Y
AD-618 932 FLD. 20

•N56170
CALIFORNIA UNIV BERKELEY
AD-618 573 FLD. 6

•N56349
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
(AFOSR 65-1093)
AD-618 188 FLD. 20

•N5613
CALIFORNIA UNIV BERKELEY
AD-618 573 FLD. 6

•N5662 278
WISCONSIN UNIV MADISON
AD-618 940 FLD. 20

•N123 62738 29282A X
RADIO CORP OF AMERICA BURLINGTON MASS AEROSPACE SYSTEMS DIV
F AD-618 198 FLD. 17

•N60RI02022
ENRICO FERMI INST FOR NUCLEAR STUDIES UNIV OF CHICAGO ILL
F AD-618 067 FLD. 20

•N600 61933 62798
MINNESOTA MINING AND MFG CO ST PAUL
AD-618 037 FLD. 10

•N62998 2453
OXFORD UNIV (ENGLAND)
AD-618 238 FLD. 5
AD-618 239 FLD. 6
OXFORD UNIV (ENGLAND) INST OF EXPERIMENTAL PSYCHOLOGY
AD-618 606 FLD. 5

•N62998 2927
OXFORD UNIV (ENGLAND) INST OF EXPERIMENTAL PSYCHOLOGY
AD-618 266 FLD. 5
AD-618 267 FLD. 5

•N62998-2281
SIR WILLIAM DUNN SCHOOL OF PATHOLOGY UNIV OF OXFORD (ENGLAND)
AD-618 119 FLD. 6

•OCD PS64 90
IIT RESEARCH INST CHICAGO ILL
F AD-618 914 FLD. 15

•PHS AM07803 02
WASHINGTON UNIV SEATTLE
AD-618 908 FLD. 6

•PHS AM0829
WASHINGTON UNIV SEATTLE
AD-618 909 FLD. 6

•PHS AM08993
WASHINGTON UNIV SEATTLE
AD-618 910 FLD. 6

•PHS GM10499
CALIFORNIA UNIV RIVERSIDE DEPT OF CHEMISTRY
(AROD 4719-12)
AD-617 986 FLD. 7

•PHS HE01929
JOHNS HOPKINS UNIV BALTIMORE MD
AD-618 991 FLD. 6

•PHS HE09997
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES SCHOOL OF MEDICINE
AD-618 232 FLD. 6

•PHS NB09236 01
LUND UNIV (SWEDEN)
(AFOSR 65-0999)
AD-617 991 FLD. 6

•PHS NB09379
ARMED FORCES INST OF PATHOLOGY ARMY MEDICAL CENTER WASHINGTON D C
AD-618 982 FLD. 6

•PHS TIAM9263 04
CHICAGO UNIV ILL MEDICAL SCHOOL
AD-618 613 FLD. 6

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OTHER RESEARCH REPORTS AND RELATED MATERIAL

REPORTS RELEASED BY AEC, NASA, DEPARTMENT OF COMMERCE, OTHER CIVILIAN AGENCIES, AND ALSO CERTAIN OLDER MILITARY REPORTS.

*Descriptors marked with an asterisk are included in the subject index

01. Aeronautics

AD-455 562 Field 1E
CFSTI Price: HC$2.00

Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
TEST RESULTS OF RESEARCH FOR RAPID SITE PREPARATION FOR VTOL AIRCRAFT.
Technical documentary rept.
by A. Vasiloff. Nov 64, 48p Rept. no. APL-TDR-64-104
Unclassified report

Descriptors: (*Vertical take-off planes, Landing fields), (*Landing fields, Preparation), Site selection, Soil mechanics, Blast, Afterburners, Turbojet engines, Dust, Sprays, Area coverage, Air drop operations, Polyester plastics, Boric acids, Feasibility studies, Epoxy plastics, Resorcinol, Formaldehyde, Glass textiles, Isocyanate plastics, Concrete, Sodium compounds, Silicates, Zirconium, Cements, Ceramic materials, Construction.

To operate VTOL aircraft in remote front-line areas, sites must be prepared to prevent flying foreign objects from damaging the aircraft. Research was conducted to determine whether any quick-setting soil hardeners could withstand the blast environment of the VTOL afterburner. Samples of numerous materials were tested in a special VTOL test facility consisting of a J-85-5 jet engine with afterburner that could be rotated to a vertical position to duplicate ground conditions imposed by the VTOL jet blast. A fast-curing, sprayable, resin formulation was developed and tested, and full-scale tests were made with an X-14 VTOL aircraft. The report reviews the results of these tests. (Author)

AD-457 979 Field 1C
CFSTI Prices: HC$3.00

Institute for Aerospace Studies, Univ. of Toronto (Ontario).
ON THE LATERAL INSTABILITIES OF AIRCRAFT DUE TO PARAMETRIC EXCITATION.
Technical note,
by M. Masak. Jan 65, 73p Rept. no. UTIAS-TN-86
Grant AF AFOSR222 63
Unclassified report

Descriptors: (*Aircraft, Stability), (*Jet transport planes, Stability), Lift, Pitch(Motion), Equations, Perturbation theory, Linear systems, Matrix algebra, Analog computers, Swept-back wings, Delta wings, Oscillation, Excitation, Aerodynamic characteristics, Canada.

Lateral instabilities of aircraft due to parametric excitation are studied. A theoretical discussion involving asymptotic approximations to the state transition matrix and a Liapunov stability analysis are presented first. This is followed by an analogue computer study to observe the actual phenomenon. Both high-aspect-ratio swept-wing and slender delta-wing jet transports are considered. (Author)

N65-18076 Field 1B
CFSTI Prices: HC$4.00 MF$1.00

Serendipity Associates, Sherman Oaks, Calif.
PILOT ACCEPTANCE FACTORS RELATED TO INFORMATION REQUIREMENTS AND DISPLAY CONCEPTS FOR ALL-WEATHER LANDING,
by Richard A. Behand, Ewart E. Smith, and Harold E. Price. Mar 65, 124p
Contract NAS2 1346 Unclassifed report
NASA CR-189

Descriptors: (*Instrument landings, All-weather aviation, Instrument landngs).

N65-18212 Field 1C
CFSTI Prices: HC$4.00 MF$1.00

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
LANDING GEAR LOADS OBTAINED DURING SIMULATED LANDING TESTS OVER VARIOUS OBSTACLES,
by Robert C. Dreher. Mar 65, 121p
NASA-TN-D-2690 Unclassified report

Descriptors: (*Landing gear, Loading(Mechanics), (*Tests, Landings), Simulation.

N65-18504 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EFFECTS OF SURFACE EMITTANCE ON TURBULENT SKIN FRICTION AT SUPERSONIC AND LOW HYPERSONIC SPEEDS,
by Jerry M. Allen and K. R. Czarnecki. Mar 65, 33p NASA-TN-D-2706 Unclassified report

Descriptors: (*Friction, Supersonic flow), (*Emissivity, Friction), Turbulence, Surface properties.

N65-20402 Field 1A, 22C
CFSTI Prices: HC$2.00 MF$0.50

Avco-Everett Research Lab., Everett, Mass.
HEAT TRANSFER MEASUREMENTS IN PARTIALLY IONIZED GASES,
by P. H. Rose and J. O. Stankevics. Apr 65, 47p
Contract NASw748
NASA CR-204
Unclassified report

Descriptors: (*Heat transfer, Meters), (*Atmosphere entry, Heat transfer).

N65-20403 Field 1A, 20M, 7D
CFSTI Prices: HC$2.00 MF$0.50

Avco-Everett Research Lab., Everett, Mass.
NONEQUILIBRIUM SHOCK FRONT ROTATIONAL VIBRATIONAL AND ELECTRONIC TEMPERATURE MEASUREMENTS,
by R. A. Allen. Apr 65, 24p
Contract NASw748
NASA CR-205
Unclassified report

Descriptors: (*Shock waves, Thermodynamics).

N65-20479 Field 1A
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Resear.
CHARTS FOR EQUILIBRIUM FLOW PROPERTIES OF CARBON DIOXIDE IN HYPERVELOCITY NOZZLES,
by Leland H. Jorgensen and Robert J. Redmond.
1965, 71p NASA-SP-3015
Unclassified report

Descriptors: (*Carbon dioxide, Stagnation point), (*Nozzle gas flow, Carbon dioxide), Planetary atmospheres.

N65-20992 Field 1C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
PERFORMANCE OF SEVEN SEMICIRCULAR LIFT-PRODUCING NOZZLES,
by Charles J. Shoemaker. Apr 65, 44p
NASA-TN-D-2731
Unclassified report

Descriptors: (*Exhaust nozzles, Lift), (*Jet engines, Exhaust nozzles).

N65-22605 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AFTERBODY PRESSURES ON BOTTAILED BODIES OF REVOLUTION HAVING TURBULENT BOUNDARY LAYERS AT MACH 6,
by W. Frank Staylor and Theodore J. Goldberg.
May 65, 45p NASA-TN-D-2761
Unclassified report

Descriptors: (*Bodies of revolution, Turbulent boundary layer), (*Aerodynamic loading, Bodies of revolution).

N65-22606 Field 1C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
MAXIMUM LIFT-DRAG RATIOS OF DELTA-WING, HALF-CONE COMBINATIONS AT A MACH NUMBER OF 20 IN HELIUM,
by Patrick J. Johnston, Curtis D. Snyder, and Robert D. Witcofski. May 65, 21p NASA-TN-D-2762
Unclassified report

Descriptors: (*Delta wings, Fluid dynamic properties), (*Conical bodies, Fluid dynamic properties).

PB-167 864 Field 1D, 20F
CFSTI Prices: HC$3.00 MF$0.75

Rheem Mfg. Co., Downey, Calif.
DESIGN STUDY FOR TRAINER, VISUAL FLIGHT ATTACHMENT FOR AIRCRAFT FLIGHT SIMULATOR,
by Paul L. Fox. Sep 58, 63p
Contract AF33 600 32579
WADC TR-57-137 P2; AD 233 189
Unclassified report

Descriptors: (*Flight simulators, Optical equipment), (*Visibility, Flight simulators), Pilots, Optical images, Distortion, Lenses, Illumination, Design, Maps.

A study of landing trainer problems is carried through a supplementary phase to more adequately meet requirements in the extent of the pilot's field of view. Two interesting concepts for producing wide angle optics for use in visual simulation are discussed. The problem of illuminating transparencies at low angles of incidence is covered in some detail. Mechanical problems in map handling and lense manipulation are discussed. (Author)

PB-167 881 Field 1A, 20D
CFSTI Prices: HC$3.00 MF$0.75

State Univ. of New York, Buffalo. Dept. of Mechanical Engineering.
A STUDY OF COMPRESSIBLE BOUNDARY LAYER FLOW AND LAMINAR FLOW STABILITY.
Research rept. no. 12, 1 Oct 60-30 Sep 62,
by Robert E. Mayle. May 62, 69p
Grant NSF G14548
Unclassified report

Descriptors: (*Bodies of revolution, Fluid flow), (*Boundary layer, Compressible flow), (*Laminar flow, Stability), Two-dimensional flow, Equations, Turbulence, Transformations(Mathematics), Pressure, Boundary value problems.

The boundary layer equations for compressible flow about a body of revolution were transformed to the corresponding equations in two-dimensional flow by use of Mangler's transformation. An investigation was made of the more important exact and approximate solutions of the two-dimensional compressible boundary layer equations. Fluid flow stability was investigated. A study was made of the stability problem for fluid motion without pressure gradient; the findings were extrapolated to cases with pressure gradients.

PB-167 989 Field 1A
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley.
INDUCED PRESSURES ON FLAT PLATES IN HYPERSONIC LOW DENSITY FLOW,
by S. A. Schaaf, F. C. Hurlbut, and L. Talbot.
25 Jan 57, 22p
ARDC TR-57-47, AD 113 008
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Flat plate models, Aerodynamic loading), (*Hypersonic flow, Flat plate models), Boundary layer, Compressible flow, Thickness, Wind tunnels, Shock waves.

02. Agriculture

PB-167 992 Field 2B, 5C
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
COLLECTIVE FARM INVESTMENT IN THE USSR,
by Norman M. Kaplan. 12 Jun 56, 56p
Memo. no. RM-1733
AD 111 505
Unclassified report

Rept. on Proj. RAND.

Descriptors: (*Agriculture, USSR), (*USSR, Agriculture), (*Economics, USSR), Communism, Banking, Money, Tables, Statistical analysis.

The paper is one of a series which, taken as a whole, provide the basic time series on Soviet capital formation from 1923/24 to date. The entire time series covers the following magnitudes and distributions: (1) capital formation by segments of the economy (i.e., industry, agriculture, transport, etc., and branches of each); (2) capital formation by ministries and other administrative organizations; (3) total investment in current prices by major categories (i.e., centralized investment, extra-limit investment, collective farm investment, and capital repairs); (4) total investment by major elements (i.e., construction, producers' durables, and others); and (5) total investment in constant prices. Topics discussed in this paper include: (1) Collective farm investment, as stated in Soviet sources; (2) Agricultural bank loans and bank-financed investment; (3) Estimates of collective form money investment; (4) Collective farm money instrument, 1950-1955; (5) Collective farm investment, 1930 to plan 1956-1960; (6) Comments on collective farm investment series.

03. Astronomy and Astrophysics

N65-17000 Field 3C, 3A
CFSTI Prices: HC$1.00 MF$0.50

Illinois Inst., of Tech., Chicago.
NONLINEAR ANALYSIS OF PHYSICAL LIBRATIONS
1. NEW FORMULATION AND EQUILIBRIUM ORIENTATIONS DEDUCED FROM AN INTEGRAL OF MOTION,
by R. L. Duncombe and I. Michelson.
Feb 65, 20p
Grant NsG561 Unclassified report
NASA CR-168

Descriptors: (*Moon, Exploration), (*Celestial mechanics, Mathematical analysis), Motion, Moment of inertia.

N65-19900 Field 3B
CFSTI Prices: HC$1.00 MF$0.75

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
LUNAR SURFACE STUDIES; A CONTINUING BIBLIOGRAPHY.
Mar 65, 54p NASA-SP-7003-(01)
Unclassified report

Descriptors: (*Lunar probes, Bibliographies), (*Moon, Surface properties).

N65-19924 Field 3A, 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
EQUATIONS FOR ISENTROPIC AND PLANE SHOCK FLOWS OF MIXTURES OF UNDISSOCIATED PLANETARY GASES,
by Victor L. Peterson. Apr 65, 34p
NASA-TR-R-222
Unclassified report

Descriptors: (*Planetary atmospheres, Gas flow), (*Shock waves, Planetary atmospheres).

N65-23828 Field 3A, 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
DETERMINATION OF DESIGN METEOROID MASS FOR A SPORADIC AND STREAM METEOROID ENVIRONMENT,
by Donald J. Kessler and Robert L. Patterson.
May 65, 26p NASA-TN-D-2828
Unclassified report

Descriptors: (*Meteors, Mathematical predictons), (*Space environmental condtions, Meteors).

PB-167 856 Field 3C
CFSTI Prices: HC$1.00 MF$0.50

Harvard Coll. Observatory, Cambridge, Mass. Meteor Dept.
RADAR DETERMINATION OF METEOR ORBITS.
Research rept.,
by Gerald S. Hawkins. 1962, 17p Rept. no. RR-13
Grant NSF G20135
Unclassified report

Descriptors: (*Meteors, Orbital trajectories), (*Orbital trajectories, Determination), (*Radio astronomy, Meteors).

The development of the study of meteor orbits is described from the single station to the multistation systems. Meteor orbits are divided into two classifications, major streams and minor streams plus sporadics. The orbits of the major streams are similar in their distribution to the orbits of short period and long period comets, but the second group exhibits different characteristics. More than 99% of sporadic meteors with mass greater than 10 mgms are moving in direct orbits. This unidirectional rotation is an important property of the particles in interplanetary space. At fainter magnitudes the results of the Harvard Radio Meteor Project and other researchers reveal an additional component. A large proportion of the smaller particles are moving in almost circular orbits tilted at a steep angle to the plane of the solar system. If this 'toroidal group' represents a steady state system then it is of considerable importance in cosmogony. (Author)

PB-167 859 Field 3B
CFSTI Prices: HC$1.00 MF$0.50

Center for Radiophysics and Space Research, Cornell Univ., Ithaca, N. Y.
AN OPEN MODEL OF THE GALACTIC MAGNETIC FIELD,
by D. Sciama. 1 Sep 61, 22p
Research rept. no. RR-RS-30
Grant NSF G18023 Unclassified report

Descriptors: (*Galaxies, Magnetic fields), (*Astrophysics, Galaxies), Cosmic rays, Radio astronomy, Astronomical data, Mathematical models, Correlation techniques.

It is shown that cosmic ray and radio astronomical data are consistent with an open model of the galactic magnetic field, in which the lines of force run into intergalactic space and close around the local cluster of galaxies. The intergalactic magnetic field is associated with an ionized gas of density 10 to the minus 27 power gm/cc. The halo of a galaxy may be regarded as that part of the intergalactic gas which is under the gravitational control of the galaxy. In this model the cosmic rays spend most of their time in intergalactic space. Relativistic electrons also spend most of their time in intergalactic space, and the only important loss is leakage out of the cluster. If the magnetic moment is a constant of the electrons' motion, the ratio emissivity is proportional to H(3), (6), which implies a magnetic field in spiral arms, disk, halo and intergalactic space of about 0.000005, 0.000002, 0.000001, 0.0000001 gauss respectively. Further implications of the model are (1) only 15 per cent of relativistic electrons are secondary, (2) the spectral index of the electrons should be the same as that of cosmic ray protons, and (3) the spectral index of radio emission should be the same for all parts of the cluster (except, perhaps, for localized sources).

PB-167 886 Field 3B
CFSTI Prices: HC$3.00 MF$0.75

McMath-Hulbert Observatory, Pontiac, Mich.
McMATH-HULBERT OBSERVATORY WORKING LIST OF FLARES AND DAILY FLARE INDEX FOR 1961,
by Helen W. Dodson and E. Ruth Hedeman.
15 Mar 63, 53p IGA Solar Activity-21
Grant NSF G16851
Unclassified report

Descriptors: (*Solar flares, Indexes), Astrophysics, Solar disturbances, Astronomical data, Tables, Graphics.

PB-167 897 Field 3B, 9B
CFSTI Prices: HC$7.00 MF$1.75

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
PROCEEDINGS, FIRST HARVARD-SMITHSONIAN CONFERENCE ON STELLAR ATMOSPHERES.
21 Dec 64, 336p Special rept. no. SAO-SR-167
Unclassified report

Rept. on Research in Space Science.

Descriptors: (*Planetary atmospheres, Models(Simulations)), (*Stars, Atmosphere), (*Atmosphere models, Planetary atmospheres), Numerical methods and procedures, Data processing systems, Programming-(Computers), Astrophysics, Symposia.

The conference was held to meet a need for discussion among workers who have developed computer programs for the construction of model atmospheres.

PB-167 901 Field 3C, 3A, 3B
CFSTI Prices: HC$7.00 MF$1.75

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
AN ANALYSIS OF THE ATMOSPHERIC TRAJECTORIES OF 413 PRECISELY REDUCED PHOTOGRAPHIC METEORS,
by Luigi G. Jacchia, Franco Verniani, and Robert E. Briggs. 23 Apr 65, 318p
Special rept. no. SAO-SR-175
Unclassified report

Report on Research in Space Science.

Descriptors: (*Meteors, Celestial mechanics), (*Celestial mechanics, Meteors), Trajectories, Photographic analysis, Statistical analysis, Fragmentation, Ablation, Optical properties.

This paper presents a statistical evaluation of the atmospheric trajectories of the 413 precision-reduced meteors, doubly photographed with the Super-Schmidt cameras in New Mexico, for which orbital data were previously published and analyzed by Jacchia and Whipple (1961). The dependence of heights, lengths, decelerations, and magnitudes is studied on such basic parameters as velocity, angle of incidence, and mass, as well as on derived parameters such as the ablation coefficient and the fragmentation index; the latter are in turn related to the other geometric and physical characteristics, including the phenomena of wake and terminal blending. A comparison with classical meteor theory shows again and again that fragmentation is the most important factor in causing the wide discrepancies between theory and observation.

PB-167 904 Field 3A, 17H
CFSTI Prices: HC$2.00 MF$0.50

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
THE PRAIRIE METEORITE NETWORK,
by Richard E. McCrosky and Harold Boeschenstein, Jr.
24 May 65, 27p Special rept. no. SAO-SR-173
Unclassified report

Rept. on Research in Space Science.

Descriptors: (*Meteors, Optical tracking), (*Optical tracking, Meteors), Astronomy, Photographic techniques, Photographic equipment, Optical instruments, Data processing systems, Position finding.

The Prairie Meteorite Network is a group of 16 camera stations, extending from South Dakota to Oklahoma and from Illinois to Nebraska, established for the optical observation of meteors.

PB-167 905 Field 3B, 20F
CFSTI Prices: HC$7.60 MF$2.25

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
THE FORMATION OF SPECTRUM LINES.
PROCEEDINGS, HARVARD-SMITHSONIAN CONFERENCE ON STELLAR ATMOSPHERES (2nd).
17 May 65, 468p Special rept. no. SAO-SR-174
Unclassified report

Rept. on Research in Space Science.

Descriptors: (*Stars, Line spectrum), (*Line spectrum, Stars), (*Astrophysics, Stars), Symposia, Planetary atmospheres, Spectroscopy, Atomic properties, Molecular properties.

The purpose of the conference was to discuss the current state of knowledge of the problem of the formation of

spectral lines in order to deduce the properties of the stellar atmosphere from observations of the strength and shape of a spectral line or lines. This introduces two separable aspects: firstly, that of the basic atomic emission and absorption processes; secondly, the quantity of radiation which is generated, absorbed, and transferred through the atmosphere. The first aspect is essentially a question of radiation theory on an atomic scale; the second introduces the macroscopic aspects of radiative transfer from which predictions are made as to the observable spectral features which must be interpreted. In the discussion of the transfer of radiation, certain bulk emission and absorption coefficients can be introduced; to be meaningful these macroscopic quantities must be interpreted in terms of the microscopic properties of the gas. Much of the discussion will center on this question.

PB-167 913 Field 3B
CFST Prices: HC$5.00 MF$1.25

Smithsonian Institution, Cambridge, Mass.
Astrophysical Observatory.
TRANSFER OF RADIATION IN STOCHASTIC MEDIA,
by George B. Rybicki. 4 Jun 65, 188p
Special rept. SR-180
Unclassified report

Rept. on Research in Space Science.

Descriptors: (*Stars, Atmosphere), (*Stochastic processes, Solar atmosphere), (*Solar atmosphere, Stochastic processes), Transport properties, Green's functions, Invariance, Integral transforms.

Radiative transfer equations are derived for a medium with small stochastically defined opacity and energy fluctuations. These equations provide relations between the correlation functions connecting these fluctuations and the induced fluctuations in the radiation field. The theory is shown to provide a description of the solar atmosphere, which has statistically defined inhomogeneities due to an underlying convection zone. A simple inhomogeneous solar model atmosphere is defined by giving the statistical distribution of energy sources in the atmosphere. The assumptions of local thermodynamic equilibrium and a depth independent gray opacity are made. It is shown how the solutions to the stochastic transfer equations in this case may be conveniently organized through the use of certain Green's functions. Useful analytic approximations for these Green's functions are obtained by use of the invariance results of Sobolev, transform techniques, and the kernel approximation. In particular, it is shown that the spatial autocorrelation function of the emergent intensity may be related to the autocorrelation function of the energy fluctuations. An unexpected result is that long-range correlations in the emergent intensity may appear which are not directly related to the correlation scales in the energy fluctuations. Rather they are related to the depth of the zone in which the energy fluctuations occur, even if this is large in comparision with a radiation mean free path. This result suggests the possibility that observations of the long-range correlations in the solar intensity field may yield information about the depth of the underlying convective zone.

04. Atmospheric Sciences

AD-449 630 Field 4B
CFSTI Price: HC$8.00

Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.
SYNOPTIC WEATHER TYPES ASSOCIATED WITH CRITICAL FIRE WEATHER,
by Mark J. Schroeder, Monte Glovinsky, Virgil F. Hendricks, Frank C. Hood, and Melvin K. Hull.
1964, 499p
Contracts OCD OS62 143, OCD PS64 24
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Weather forecasting, Fires), (*Fires, Weather forecasting), (*Forest fires, Weather forecasting), Meteorological parameters, Atmospheric motion, Wind, Meteorological charts, United States, Urban areas, Fire safety.

Mass fires are likely to spread rapidly and burn intensely when strong winds are combined with low humidities and high temperatures, particularly after a rainless period. To identify synoptic weather types that create such periods of critical fire weather, the 48 contiguous states were divided into 14 regions, and fire danger indexes were computed from weather data at 89 stations for the years 1951-60. Surface weather types and upper-air patterns associated with high fire danger are described for each region. (Author)

N65-17118 Field 4A, 22C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
A TECHNIQUE FOR DETERMINING PLANETARY ATMOSPHERE STRUCTURE FROM MEASURED ACCELERATIONS OF AN ENTRY VEHICLE,
by Victor L. Peterson. Feb 65, 20p
NASA-TN-D-2669
Unclassified report

Descriptors: (*Planetary atmospheres, Physical properties), (*Atmosphere entry, Planetary atmospheres), Reentry vehicles, Acceleration.

N65-20994 Field 4A
CFSTI Prices: HC$4.00 MF$0.75

Michigan Univ., Ann Arbor.
ATMOSPHERIC SLANT PATH TRANSMISSION IN THE 15micron CO2 BAND,
by S. Roland Drayson. Apr 65, 104p
Contract NASr54 03
NASA TN-D-2744
Unclassified report

Descriptors: (*Atmosphere, Infrared radiation), (*Infrared radiation, Absorption spectrum).

N65-22362 Field 4A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SURVEY OF THE LITERATURE ON THE SOLAR CONSTANT AND THE SPECTRAL DISTRIBUTION OF SOLAR RADIANT FLUX,
by M. P. Thekaekara. 1965, 43p NASA-SP-74
Unclassified report

Descriptors: (*Solar radiation, Spectra(Visible + Ultraviolet).

N65-23164 Field 4A, 8N
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
CORPUSCULAR STREAMS RELATED TO SOLAR M-REGIONS,
by Tatsuzo Obayashi. May 65, 12p NASA-TN-D-2790
Unclassified report

Descriptors: (*Solar wind, Magnetic storms), (*Sunspots, Magnetic storms).

PB-167 674 Field 4B
CFSTI Prices: HC$2.00 MF$0.50

Chicago Univ., Ill. Dept. of the Geophysical Sciences.
USE OF TIROS PICTURES FOR STUDIES OF THE INTERNAL STRUCTURE OF TROPICAL STORMS WITH RECTIFIED PICTURES FROM TIROS I ORBIT 125, R/O 128.
Research paper,
by Tetsuya Fujita and Toshimitsu Ushijima. Oct 63, 29p Rept. no. RP-25
Grant Cwb WBG6
Unclassified report

Descriptors: (*Tropical cyclones, Photographic analysis), (*Meteorological satellites, Aerial photography), Cloud cover, Pictures, Air mass analysis, Marine meteorology, Pacific Ocean, Weather forecasting.

A series of TIROS I pictures of the South Pacific tropical storm of 10 April 1960, rectified with great accuracy, was used to study the fine structure of the storm. Three orientations of clouds-in-line were examined in an attempt to find their causes. The first orientation represents the direction of the low level winds along which small cumuli align as a cloud street. The second corresponds to the so-called hurricane rainband and probably represents a streak line when large convective towers originate at a fixed source on the earth. The plumes of cirrus from high convective towers appear as the third orientation. A theoretical study leading to the determination of cloud height from shadow on the ocean surface was also made. It was found that it is feasible to identify shadows if coulds are located over an area of ocean sunglint. (Author)

PB-167 887 Field 4A, 20N
CFSTI Prices: HC$3.00 MF$0.75

Thayer School of Engineering, Dartmouth Coll., Hanover, N. H.
CHOROUS, HISS, AND OTHER IONOSPHERICS AT STATIONS OF THE 'WHISTLERS-EAST' NETWORK,
by T. Laaspere, M. G. Morgan, and W. C. Johnson. Nov 62, 54p
Grant NSF P13460E
Unclassified report

Descriptors: (*Atmospherics, Audiofrequency), (*Electromagnetic waves, Ionosphere), (*Ionosphere, Electromagnetic waves), Geophysics, Meteorological phenomena, Electronic recording systems, Polar regions.

Audio-frequency electromagnetic waves originating somewhere in the ionosphere or the magnetosphere of the earth ('ionospherics') have been recorded for more than five years at the 'Whistlers-East' receiving stations. The stations extend approximately north-south from Labrador to Antarctica and make it possible to study the latitude dependence of (a) the time of maximum occurrence of the various types of ionospherics; (b) the shape of the diurnal curves; (c) the level of activity; and (d) the effects of geomagnetic disturbances. The results should have a direct relation to the complex geophysical phenomena involved in the emission processes since, contrary to whistlers, at most stations the occurrence of ionospherics appears to be controlled by the emission mechanism and not by propagation effects. (Author)

PB-167 900 Field 4A, 3C, 22B
CFSTI Prices: HC$4.00 MF$0.75

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
DENSITIES AND TEMPERATURES FROM THE ATMOSPHERIC DRAG ON SIX ARTIFICIAL SATELLITES,
by Luigi G. Jacchia and Jack Slowey. 26 Mar 65, 115p Special rept. no. SR-171
Grant NsG87 60
Unclassified report

Rept. on Research in Space Science.
Available copy will not permit fully legible reproduction.

Descriptors: (*Atmospheric sounding, Satellites-(Artificial)), (*Satellites(Artificial), Atmospheric sounding), Atmosphere, Density, Atmospheric temperature, Drag, Atmosphere models, Celestial mechanics, Tables.

Densities and temperatures derived from the atmospheric drag were recomputed for six of the satellites for which data were given in an earlier paper (Jacchia and Slowey, 1963, N62-16412). The new results, obtained with an improved atmospheric model, supersede those given in that paper. In addition, the analysis was extended to a considerably longer inteval for all but one of the six satellites. (Author)

PB-167 906 Field 4A, 4B
CFSTI Prices: HC$2.00 MF$0.50

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
SOME RESULTS AT SMITHSONIAN OBSERVING STATIONS,
by Peter Brand, John Mazzotta, Leonard Solomon, Roy Proctor, and James Latimer. 17 May 65, 40p
Special rept. no. SAO-SR-176
Unclassified report

Rept. on Research in Space Science.

Descriptors: (*Atmospheric sounding, Instrumentation), Cloud cover, Scientific satellites, Optical tracking, Sounding rockets, Sodium, Aluminum compounds, Metalorganic compounds, Luminescence, Photography, Meteorological balloons, Astronomical observatories.

Contents
Statistics on Cloud Cover at Baker-Nunn Observing Sites
Residuals in Field-Reduced Observations
Photography of Chemiluminescent Studies of Upper Atmosphere Wind Phenomena
Baker-Nunn Tracking of the Air Density Explorer Balloon and the Injun Explorer Spacecraft.

PB-167 984 Field 4A, 14B
CFSTI Prices: HC$3.00 MF$0.75

Cosmic Ray Group, Univ. of Minnesota, Minneapolis.

CONTINUOUS BALLOON MONITORING OF COSMIC RAYS AND SOLAR PHENOMENA, APPENDIX I: BALLOON STUDY OF HIGH ALTITUDE RADIATIONS DURING THE INTERNATIONAL GEOPHYSICAL YEAR.
Final rept., App. 1,
by John R. Winkler. Mar 60, 70p
Technical rept. no. CR-26
Grant NSF G13833 Unclassified report

Final rept., PB-167 911.

Descriptors: (*Meteorological balloons, Radiation monitors), (*Radiation monitors, Meteorological balloons), Gamma rays, X rays, Cosmic rays, Solar radiation, High-altitude, Instrumentation, Ionization chambers, Geiger counters, Colloids, Radiation measurement systems, Aurorae, Atmospheric sounding, Electrons.

The results of a series of 85 constant level balloon flights conducted during the IGY period to measure cosmic rays and other types of radiation at high altitude are summarized. Each flight carried an ionization chamber, a Geiger counter, and nuclear emulsions, and remained at approximately 10 g/sq cm depth for times between 2 and 24 hours. The majority of flights were made at Minneapolis, Minnesota. The large decrease in primary cosmic ray intensity between 1956 and 1958 was observed at high altitude. The high altitude measurements correlate with sea level neutron instruments. Many special events were detected, including x-rays produced by electrons incident on the atmosphere during strong aurorae and solar cosmic rays detected on 10 occasions and correlating with other known observations made in the polar regions. In one case gamma-rays originating on the solar surface were detected in a short burst. Several cases of radioactive layers in the atmosphere at low level resulting from nuclear explosions were found. This paper summarizes the entire program, and gives the instrumental details, a summary of published information, and detailed analysis of many data not heretofore published. (Author)

PB-168 077 Field 4B, 14E, 22B
CFSTI Prices: HC$4.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
THE DISTRIBUTION OF CLEAR AIR TURBULENCE REPORTS AND CLOUD PATTERNS AS SEEN IN SATELLITE PHOTOGRAPHS.
Final rept.,
by Eldon J. Wiegman. Jan 65, 114p Unclassified report
Contract Cwb10791, Proj. 4842

Descriptors: (*Cloud cover, Aerial photographs), (*Turbulence, Atmospheric motion), (*Weather forecasting, Meteorological satellites), (*Meteorological satellites, Weather forecasting), Air mass analysis, Meteorological parameters, Correlation techniques, Meteorological charts, Photointerpretation.

The objective of the study was to ascertain if the cloud patterns displayed in satellite photographs would provide an aid in locating areas of clear air turbulence risk. Results of the study indicate limited success. Turbulence above 30,000 feet MSL of moderate to strong intensity was most commonly associated with jet streams. The cloud patterns offered only limited aid in their location. Identification of the polar front jet stream was most feasible whenever a complete frontal and vortex cloud pattern was evident, especially under a long-wave trough condition. Turbulence below 20,000 feet was most often associated with mountainous terrain or frontal clouds. Cloud patterns over mountains consisted of crest clouds or lee-wave clouds, although turbulence existed without cloud evidence. With frontal cloud patterns, the majority of the turbulence was located in the warm air above the warm frontal surface in advance of its surface position. Turbulence existed over cumulonimbus activity within several thousand feet of cloud top.

PB-168 078 Field 4B, 14E, 22B
CFSTI Prices: HC$4.00 MF$0.75

ARACON Geophysics Co., Concord, Mass.
THE INDENTIFICATION AND INTERPRETATION OF CLOUD VORTICES USING TIROS INFRARED OBSERVATION.
Final rept.,
by Paul E. Sherr and C. W. C. Rogers. Mar 65, 108p
Rept. no. 8G6-F Unclassified report
Contract Cwb10812

Descriptors: (*Cloud cover, Aerial photographs), (*Vortices, Cloud cover), (*Weather forecasting, Meteorological satellites), (*Meteorological satellites, Weather forecasting), Infrared scanning, Clouds, Storms, Atmospheric motion, Meteorological parameters, Photointerpretation, Meteorological charts, Air mass analysis.

This report describes the results of investigations which have clearly demonstrated that (1) cloud vortices can be reliably identified in the TIROS Channel 2 (8-12 micron) infrared data; (2) the Channel 2 data are adequate to distinguish between vortex categories; and (3) significant additional information in the form of a three dimensional analysis becomes available when the IR data are integrated with the TIROS picture data. A principal conclusion of this study is that the classical frontal wave development sequence does not adequately describe many of the cloud vortex types observed by TIROS. The radiation analyses provided the basis for the development of an hypothesis for vortex cloud formation based on physical and dynamical atmospheric processes and a simplified cyclone development model.

PB-168 079 Field 4B, 14E, 22B
CFSTI Prices: HC$3.00 MF$0.75

Bollay (E.) Associates, Inc., Goleta, Calif.
AN EVALUATION OF CLOUD DECK AND PRECIPITATION EPISODE FORECASTING ALONG THE WEST COAST.
Final rept.,
by John G. Cronin. Jun 65, 95p Unclassified report
Contract Cwb10962

Descriptors: (*Weather forecasting, Cloud cover), (*Cloud cover, Weather forecasting), (*Atmospheric precipitation, Weather forecasting), Meteorological satellites, Aerial photography, Clouds, Errors, Weather communications.

FT and FA messages over one 30 day and one 60 day interval are evaluated in terms of total misses and timing errors in forecasting the occurrence of significant cloud decks and precipitation episodes at four West Coast stations. Precipitation episodes are categorized on a duration basis in an attempt to determine whether relatively long or relatively short duration episodes are more difficult to forecast. The criterion that satellite cloud photographs were available in the pertinent area was applied in the selection of 13 episodes which are illustrated through the use of time sections; cloud photographs are presented as part of the illustration of one episode to show the possible application of this kind of data to the forecasting procedure. (Author)

05. Behavioral and Social Sciences

AD-280 259 Field 5H, 5E, 5I
CFSTI Prices: HC$3.00

RAND Corp., Santa Monica, Calif.

OPERATIONAL AND HUMAN FACTORS IN PLANNING AUTOMATED MAN-MACHINE CHECKOUT SYSTEMS,
by Sidney I. Firstman and Nehemiah Jordan.
Apr 62, 69p Memo no. RM-2835-PR
Unclassified report

Descriptors: (*Checkout equipment, Automatic), (*Human engineering, Checkout equipment), (*Checkout procedures, Systems engineering), Management planning, Weapon systems, Air force personnel, Training, Test equipment, Motivation, Performance(Human), Design, Costs.

The paper is intended as an aid to automated checkout system planning and design. The report considers the nature of an adequate over-all system analysis and the manner in which such an analysis can lead to desirable design characteristics for testing. The capabilities and limitations of present automated test equipment and operator-technicians are delineated and discussed. The paper examines the psychological environment of the operator--his needs, problems, and goals--and design features useful for integrating him into an automated test system. The demands that integration of an automated test system make upon a military system, its prime equipment, ground system, and personnel, are considered. (Author)

AD-461 230 Field 5E
CFSTI Price: HC$1.00

Human Engineering Labs., Aberdeen Proving Ground, Md.
CHECK-READING ACCURACY AS A FUNCTION OF AN EXTENDED-POINTER DIAL DISPLAY,
by Lynn C. Oatman. Jul 64, 21p
Technical memo. TM-10-64
Unclassified report

Descriptors: (*Display systems, Human engineering), (*Human engineering, Display systems), Effectiveness, Applied psychology, Design, Performance tests, Analysis of variance.

Three simulated dial displays were compared in a check-reading task. An extended-pointer dial display was compared with an aligned and an extended-line dial display. The three dial displays were presented to 34 subjects who were asked to indicate whether or not the display contained a deviant pointer, and, if so, to locate the deviant pointer. The data indicate that subjects performed significantly better with the extended-pointer display than with either the aligned or the extended-line display. Location within a display was found to be an important determinant of the number of deviant pointers detected. (Author)

N65-17326 Field 5H, 17I
CFSTI Prices: HC$3.00 MF$0.75

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
A THEORY FOR THE OPTIMAL DETERMINISTIC CHARACTERIZATION OF THE TIME-VARYING DYNAMICS OF THE HUMAN OPERATOR,
by Walter W. Wierwille and Gilbert A. Gagne.
Feb 65, 66p
Contract NAS1 3485
NASA CR-170
Unclassified report

Descriptors: (*Tracking, Operators(Personnel)), (*Performance(Human), Tracking), Optimization, Errors.

N65-17329 Field 5H
CFSTI Prices: HC$4.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge.
REMOTE MANIPULATION WITH TRANSMISSION DELAY,
by William R. Ferrell. Feb 65, 119p
Grant NsG107 61
NASA TN-D-2665
Unclassified report

Descriptors: (*Remote control systems, Delay circuits), (*Delay circuits, Wave transmission).

N65-17535 Field 5B, 22A
CFSTI Prices: HC$5.00 MF$1.00

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
CONTRACT NUMBER INDEX TO REPORTS ANNOUNCED IN STAR; CUMULATIVE INDEX TO ITEMS IN STAR, VOL. 2.
1964, 155p NASA-SP-7019
Unclassified report

Descriptors: (*Indexes, Astronautics), (*Astronautics, Indexes).

N65-18186 Field 5B, 22A
CFSTI Prices: HC$1.75 MF$1.00

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
GUIDE TO THE SUBJECT INDEXES FOR SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS.
Feb 65, 167p NASA-SP-7016 Rev. 1
Unclassified report

Descriptors: (*Subject indexing, Astronautics), (*Astronautics, Subject indexing).

N65-21226 Field 5B, 5E, 22B
CFSTI Prices: HC$4.00 MF$1.00

Bunker-Ramo Corp., Canoga Park, Calif.
A BIBLIOGRAPHY OF RUSSIAN SCIENTIFIC AND TECHNOLOGICAL LITERATURE IN MANUAL CONTROL AND ASSOCIATED AREAS,
by C. M. Bertone. Apr 65, 132p
Contract NASw869
NASA CR-199
Unclassified report

Descriptors: (*Bibliographies, Control systems), (*Scientific research, USSR), Manned spacecraft, Human engineering.

PB-167 464 Field 5C
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE VALUE OF AMERICAN MANUFACTURING PLANT AND EQUIPMENT,
by R. N. Grosse. 28 Apr 55, 46p Rept. no. RM-1474
AD 87 162
Unclassified report

Rept. on Proj. RAND
Available copy will not permit fully legible reproduction.

Descriptors: (*Industrial plants, Economics), (*Industrial equipment, Economics), (*Factories, Economics), (*Economics, Industrial equipment), United States, Industries, Costs.

This report presents the estimates, data sources, and method used in the preparation of the information tabulated on the U. S. stock of manufacturing plant and equipment. Table I lists the capital requirements for new plant in terms of equipment and structures required per dollar of annual capacity increase in each of these manufacturing industries, and the replacement value of the capital goods in each of these industries, both in 1947 prices. Replacement values were computed by multiplying the annual capacity of each industry by the appropriate ratio of capital requirements required per dollar of annual capacity increase. Estimates of capacities are given for each manufacturing industry in the economy. The estimates are intended to represent the maximum capacity as of the beginning of 1954, measured in 1947 prices. The estimates are limited to manufacturing industries because the immediately projected use was in conjunction with a punch card deck prepared from the Census data on manufacturing plants. As this deck is based on 1947 information, the capacity estimates were made in 1947 dollars. (Extracted)

PB-167 666 Field 5B, 5A, 5D
CFSTI Prices: HC$3.00 MF$0.50

Northwestern Univ., Evanston, Ill. Dept. of Industrial Engineering and Management Sciences.
A PROPOSAL FOR A STUDY OF RESEARCH PERSONNEL IN THEIR INFORMATION ENVIRONMENT.
15 Mar 64, 51p
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Scientific personnel, Information retrieval), (*Information retrieval, Scientific personnel), (*Personnel management, Information retrieval), Management engineering, Engineering personnel, Operations research, Costs, Simulation, Effectiveness, Communication theory, Documentation, Data processing systems, Systems engineering, Research program administration.

The proposal is concerned with the study of information services for the scientist and engineer by: (1) field observation of the timing, patterns, costs and varieties of information required; (2) simulation of the structure of a repertoire of information services to determine the cost and serviceability of different repertoires; and (3) operational experiments to behaviorally evaluate new services which are synthesized as part of an information repertoire. (Author)

PB-167 685 Field 5D
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
RECENT COMMUNIST TACTICS IN INDONESIA,
by Guy Pauker. 15 Aug 60, 28p
Research memo. RM-2619-RC
AD 248 078
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Communism, Indonesia), (*Indonesia, Communism), Government(Foreign), Communists, Leadership, Political science.

The paper attempts to answer questions frequently raised in governmental circles today about the extent and meaning of communist penetration into the governmental apparatus of Indonesia. It suggests that the Indonesian situation today does not encessarily parallel that of Eastern European countries before the coups of 1947-48. Communist penetration into the government does not seem to be successful in occupying strategic positions that could be exploited to bring off a coup. The main present purpose of the party is to build up its prestige as a 'respectable' organization to which the country, which is facing increasing chaos, would eventually turn for strong and purposeful government. These new communist tactics are made possible by President Sukarno's policies, which aim at balancing off the Army and the Communist Party, so that he may avoid becoming the political captive of either and may maintain his personal dictatorship. The conclusion is that only the disappearance of Sukarno from the Indonesian political scene is likely to prevent the ultimate success of the new communist tactics, which aim at bringing the Communist Party to power by a demonstration of genuine mass appeal - a development that would have incalculable advantages for the international communist movement. (Author)

PB-167 689 Field 5I
CFSTI Prices: HC$4.00 MF$0.75

Human Resources Research Office, George Washington Univ., Alexandria, Va.
THE DEVELOPMENT OF TRAINING OBJECTIVES,
by Roger G. Smith, Jr. Jun 65, 109p
Research bull. HumRRO-RB-11
Contract DA44 188AR02 Unclassified report
AD 448 364; N64 32681

Descriptors: (*Military training, Performance tests), (*Military personnel, Training), (*Research program administration, Military training), (*Training, Effectiveness), Training devices, Education, Job analysis, Technicians, Instructors, Military organizations, Maintenance personnel, Decision making, Achievement tests.

Modern concepts and techniques used in determining training objectives are described. A training objective is defined as a precise statement of one of the performances expected of a student upon completion of a course, a complete list of such objectives constituting the mission of a course. The concepts and techniques described are based on research performed by both military and civilian researchers in the field of training. The development of job-related, detailed statements of objectives is considered to be a matter of the first importance in designing effective training programs. These objectives permit every element of a training program--lessons, texts, practical exercises, and examinations--to fall into line in a consistent manner. Training objectives that are job relevant will provide for a course that will also be responsive to the needs of the unit to which the soldier will go after training. The techniques described were selected as being practical for Army training personnel.

PB-167 777 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Massachusetts Inst. of Tech., Cambridge.
THE MIT TECHNICAL INFORMATION PROJECT,
by M. M. Kessler. 1965, 8p
Unclassified report

Pub. in Physics Today 028-36 Mar 1965.

Descriptors: (*Information retrieval, Analysis), (*Data processing systems, Information retrieval), Subject indexing, Language, Feedback, Reports, Periodicals, Physics, Programming(Computers), Real time, Multiple operation, Scheduling.

The Technical Information Project at MIT is an experiment in information-system design. It is intended to provide a test-bed facility to evaluate search strategies, to learn from direct experience what contributions modern technology can make in solving the problems of scientific exchange, and to localize those areas in the information process where technological improvements are most likely to succeed. The paper describes the system.

PB-167 778 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
INFORMATION RETRIEVAL SYSTEMS,
by John A. Swets. 1963, 6p
Unclassified report

Pub. in Science v141 n3577 p245-50 Jul 19 1963.

Descriptors: (*Search theory, Information retrieval), (*Information retrieval, Statistical analysis), (*Statistical analysis, Information retrieval), Effectiveness, Probability, Optimization.

Statistical decision theory is discussed as a method of evaluating the performance of information retrieval systems.

PB-167 793 Field 5C
CFSTI Prices: HC$2.00 MF$0.50

Princeton Univ., N. J. Econometric Research Program.
ON THE FLEXIBILITY OF COST-PLUS PRICING,
by P. A. Tinsley. 9 Apr 65, 43p
Research memo. no. RM-75 Unclassified report
Grant NSF GP-579

Available copy will not permit fully legible reproduction.

Descriptors: (*Costs, Decision making), (*Industrial production, Costs), Economics, Effectiveness, Statistical analysis.

The paper interprets cost-plus pricing rules as rule of thumb reactions by firms to unfulfilled expectations of demand. The emphasis of this discussion of cost-plus pricing is not only the markup construction of the price but the conventional employment and modification of the markups by firms. In adapting to changing demand and cost conditions, the price decisions dictated by the cost-plus rules may be interpreted as reflecting specific assumptions about the demand-cost structures. The pricing rules are rules of thumb for situations of imperfect information. Further, it is demonstrated that the relative performance of various cost-plus rules depend upon not only the demand-cost environ of the firm but the accuracy of the firm's own characterization of the demand-cost structure.

PB-167 805 Field 5B, 5H
CFSTI Prices: HC$2.00 MF$0.50

Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
OPTIMIZING RETRIEVAL RESULTS WITH MAN-MACHINE INTERACTION,
by Robert M. Curtice and Victor Rosenberg.
Feb 65, 26p Unclassified report
Grant NSF GE2569

Descriptors: (*Information retrieval, Optimization), (*Search theory, Information retrieval), Subject indexing, Programming(Computers), Artificial intelligence, Bionics, Dictionaries.

The paper discusses the development of a retrieval search strategy based on two fundamental principles: (1) man-machine interaction and (2) the generation of index terms based on their co-occurrence as they are assigned to documents. The search request is reformulated by the user with a machine generated list of index terms related to his request. The procedure consists of a series of computer programs providing the user with various alternative methods of formulating the question and the search. The reformulated request is designed to increase the recall and specificity of the retrieval. (Author)

PB-167 822 Field 5D
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
SOME USEFUL PASSAGES FROM LENIN AND STALIN,
by Nathan Leites. 20 Mar 51, 16p
Memo. no. RM-569 Unclassified report
ATI 210 692
Rept. on Proj. RAND.
Available copy will not permit fully legible reproduction.

Descriptors: (*Communism, Reviews), (*Communists, USSR).

PB-167 836 Field 5C, 5A
CFSTI Prices: HC$5.00 MF$1.00

Case Inst. of Tech., Cleveland, Ohio. Operations Research Group.
A COMPUTABLE THEORY OF STRATEGIES IN DIFFERENTIATED OLIGOPOLIES.
Thesis,
by Robert C. Hain. 1964, 155p
Unclassified report

Descriptors: (*Economics, Industrial relations), (*Industrial relations, Economics), Theory, Commerce, Mathematical models, Optimization, Probability, Bargaining, Industrial psychology.

The purpose of this thesis is to develop a theory of strategic action for firms competing in an environment where there are a few firms selling a differentiated product. The theory is operational, that is, it depends exclusively on data available to a firm, not on subjective attitudes. An essential feature is a recognition of the stochastic nature of the sales process. This is embodied in the development of a probability model of sales from a detailed specification of the environmental and institutional factors affecting the firm. Two models are considered. The static model hypothesizes that sales depend on the levels of price and unit selling expense; while, the dynamic model hypothesizes that sales respond to changes in these variables. These models are applied to several objectives, and strategies for obtaining these objectives are developed. The basic probability model of sales has been verified with data generated by a process that simulates firms competing in the relevant environment. Some statistical summaries of the behavior of sales and profit are also presented. (Author)

PB-167 841 Field 5K, 5B
CFSTI Prices: HC$5.00 MF$1.00

Columbia Univ., New York. Bureau of Applied Social Research.
SPECIALIZED SOCIAL SCIENCE INFORMATION SERVICES IN THE UNITED STATES,
by Jack Ferguson. Apr 65, 157p
Contract NSF C278 Unclassified report

Descriptors: (*Social sciences, Information retrieval), (*Information retrieval, Social sciences), Population, Urban areas, Budgets, Statistical data, Libraries, Museums, Reports, Scientific organizations, Scientific research, United States Government, Tables.

A survey was undertaken for the purpose of describing specialized information services in the United States which deal with subjects of the social sciences and related disciplines. Such description included locating and identifying these services, surveying them by mailed questionnaire, writing a directory of services based upon the questionnaire returns, and analyzing the data collected by the survey in this report.

PB-167 843 Field 5B, 9B
CFSTI Prices: HC$1.00 MF$0.50

IBM Advanced Systems Development Div., Yorktown Heights, N. Y.
SELECTIVE DISSEMINATION OF INFORMATION (SDI): STATE OF THE ART IN MAY, 1963,
by C. B. Hensley. 1963, 6p
Unclassified report

AFIPS Conference Proceedings of the 1963 Spring Joint Computer Conference, p257-62.

Descriptors: (*Documentation, Distribution), Computers, Reports, Scientific research, Decision theory, Abstracting, Reviews.

SDI involves the use of the computer to select from a flow of new documents, those of interest to each of a number of users. This process may be thought of as the inverse of information retrieval. In information retrieval, a user precipitates a search of a file of documents. In SDI a document precipitates the search of a standing file of user interests.

PB-167 844 Field 5B
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
PREPARATION DES BIBLIOGRAPHIES AUTO-INDEXEES 'PHYSINDEX'. APPLICATION A L'ELABORATION DE VOCABULAIRES SPECIALISES,
by Nicole Chonez. May 64, 65p Rept. no. CEA-N-502
Unclassified report

Text in French.

Descriptors: (*Indexes, Preparation), (*Bibliographies, Indexes), Vocabulary, Documentation, Physics, France.

PB-167 846 Field 5B, 9B
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
PREPARATION AUTOMATIQUE DE BULLETINS BIBLIOGRAPHIQUES.
by Andre Chonez. 1964, 8p Unclassified report
Pub. in Bulletin des Bibliotheques de France v9 n5 p211-7 May 1964
Text in French
Available copy will not permit fully legible reproduction.

Descriptors: (*Bibliographies, Preparation), (*Automatic, Preparation), Indexes, Punched tape, Computers, Documentation, France.

PB-167 848 Field 5I, 6C, 5B
CFSTI Prices: HC$3.00 MF$0.75

Biological Sciences Communication Project, George Washington Univ., Washington, D. C.
INFORMAL COMMUNICATION AMONG BIOSCIENTISTS. PART II. POLICIES AND PRACTICES DEALING WITH INFORMAL COMMUNICATION AS RELATED TO PRODUCTIVITY AND EFFICIENCY IN 64 SELECTED BIOLOGICAL LABORATORIES,
by Charles W. Shilling and Jessie Bernard. Jun 64, 88p BSCP-16A-64
Grant NSF G23975
Unclassified report

Descriptors: (*Social communication, Scientific personnel), (*Biological laboratories, Scientific personnel), (*Scientific personnel, Social communication), Medical personnel, Scientific research, Reports, Information retrieval, Job analysis.

Contents:
Background information
Laboratories studied
Subjects
Technical problems
Laboratory productivity and information efficiency
Laboratory policies with respect to informal communication in the different types of laboratory
Laboratory practices with respect to informal communication

PB-167 850 Field 5B
CFSTI Prices: HC$4.00 MF$1.00

Itek Labs., Lexington, Mass.
L-DICTIONARY, PRELIMINARY PARTIAL VERSION, JULY-AUGUST 1959.
1959, 127p
Contract NSF C88
Unclassified report

Descriptors: (*Dictionaries, Information retrieval), (*Language, Indexes), Search theory, Vocabulary, Data processing systems.

An L-dictionary coding patterrn is described.

PB-167 862 Field 5I, 1D, 5J
CFSTI Prices: HC$4.00 MF$0.75

Air Force Personnel and Training Research Center, Randolph AFB, Tex. Operator Lab.
PHASE VI FUNCTIONAL SUITABILITY TEST OF THE F-151/F-100A FIXED GUNNERY TRAINER. Development rept.,
by Edward R. Jones and Robert H. DiVall.
Jul 57, 113p Rept. no. AFPTRC-TN-57-96
AD 134 219
Unclassified report

Descriptors: (*Flight simulators, Visual signals), (*Training devices, Tests), (*Aerial gunnery, Training devices), Fighters, Pilots, Targets, Television display systems, Performance tests.

Examination of the trainer indicated a number of design deficiencies which reduced the trainer's capability. The more important ones involved: (1) the lack of cross-roll correction for the A-4 Sight, (2) inadequate target resolution, (3) no acceleration-stall warning in the F-100A simulator, (4) limited ground-controlled interception (GCI) training capability, (5) unreliable hit-scoring system, (6) inadequate target maneuverability, (7) no

facilities for the introduction of sight or armament system malfunctions, (8) no indicators at the instructor's console of the armament and sight setting, (9) and inadequate human engineering of the instructor's console. The extent of these deficiencies was not markedly greater than those found in many other synthetic trainers in operational use. There was no opportunity to demonstrate learning because of the unreliability of hit scoring and the difficulty in obtaining standard target conditions. F-100A pilots participating in the test were evenly divided as to whether they would want an F-151 available if they were squadron commanders. The F-151/F-100A can be used effectively for limited aspects of gunnery training. However, the benefits will be largely a function of the manner in which the device is used. (Author)

PB-167 863 Field 5I, 1D, 5J
CFSTI Prices: HC$4.00 MF$1.00

Rheem Mfg. Co., Downey, Calif.
DESIGN STUDY FOR TRAINER, VISUAL FLIGHT ATTACHMENT FOR AIRCRAFT FLIGHT SIMULATORS,
by Paul L. Fox. Mar 57, 142p
Contract AF33 600 32579
WADC TR-57-137 P1; AD 216 438
Unclassified report

Descriptors: (*Flight simulators, Optical equipment), (*Training devices, Design), Display systems, Visual signals, Pilots, Light, Electronic equipment, Feasibility studies.

Design of a comprehensive visual display system to be attached to and used in conjunction with a fixed-based electronic flight simulator is described. The recommended design concept is based upon a rotary-sweep optical system capable of generating an extremely wide-angle presentation using narrow-angle techniques. Validity and feasibility of the system were established through engineering study and experimental development. The optical system is currently being subjected to a detailed mathematical analysis by an optical engineering firm for confirmation of the first-order design. Subject to the results of this mathematical analysis, it was concluded that Phase II of the proposed visual flight attachment system should be started. (Author)

PB-167 879 Field 5B, 6C
CFSTI Prices: HC$3.00 MF$0.75

American Inst. of Biological Sciences, Washington, D. C.
A FEASIBILITY STUDY OF BIOLOGICAL SERIAL RECORD CENTER.
5 Feb 62, 94p
Unclassified report

Descriptors: (*Biology, Information retrieval), (*Documentation, Biology), (*Information retrieval, Biology), Bibliographies, Periodicals, Libraries, Indexes, Abstracting, Costs, Budgets.

Specific aims of the research are to conduct an experiment to determine the feasibility and/or necessity for the establishment of a Biological Serial Record Center, covering the biological literature of the world. If such a center is found to be desirable, it would be envisioned as having the following objectives: (a) To assemble, organize, analyze, and disseminate continuously comprehensive data concerning all types of biological serial publications. To have bibliographical knowledge of all serial publications in this field and to make available to biological scientists this bibliographical information. (b) More specifically, the tangible objective of such a center would be to maintain a file of cards suitable for machine handling and which would include the following information on a current basis: (1) If titles appear in several languages, each would be reported. Also titles and subtitles would be reported in English. Date of change would be indicated. (2) If abbreviation appears in the journal, it would be reported as published. In addition, the abbreviation as published in World List of Scientific Periodicals and National Library of Medicine Modifications would be reported. If not published in either, an abbreviation would be made on the basis of principles established by the World List of ISO Recommendation R sub 4 'International Code for the Abbreviation of Periodicals.'

PB-167 880 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
CURRICULUM FOR THE INFORMATION SCIENCES. LECTURE-SEMINARS IN THE INFORMATION SCIENCES.
Jun 65, 6p Rept. no. R-3
Grant NSF GE2569
Unclassified report

Descriptors: (*Education, Information retrieval), (*Documentation, Symposia), Automatic indexing, Search theory, Analysis, Artificial intelligence, Language, Computers, Dictionaries, Bibliographies, Abstracting, Education.

Abstracts are given of papers presented at seminars in the information sciences.

PB-167 912 Field 5B, 11F
CFSTI Prices: HC$2.00 MF$0.50

Western Reserve Univ., Cleveland, Ohio. Center for Documentation and Communication Research.
TEST PROGRAM FOR EVALUATING PROCEDURES FOR THE EXPLOITATION OF LITERATURE OF INTEREST TO METALLURGISTS. VI. AN ANALYSIS OF OUTPUT COSTS AND PROCEDURES FOR AN OPERATIONAL SEARCHING SERVICE,
by LaVahn Overmyer. 1960, 50p
Grant NSF G10338
Unclassified report

Descriptors: (*Information retrieval, Costs), (*Metals, Information retrieval), Management engineering, Metallurgy, Tests, Research program administration.

A report is made specifically on the 'output,' i.e., providing answers to questions by means of machine searching of the American Society for Metals Documentation Service. It discusses in detail the procedures and costs of conducting searches, and it exposes several of the important but not easily predicted variables which affect the entire cost structure. Unlike Report No. IV, which analyzed the 'input' costs of the Service and formulated a final figure of $6.503 per abstract, Report No. VI presents ranges of costs which are applicable only to given situations. (Author)

PB-167 917 Field 5D, 15G
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
THE ROLE OF THE MILITARY IN INDONESIA,
by G. J. Pauker. 1 Sep 60, 76p
Memo. no. RM-2637-RC
AD 249 507
Unclassified report

Rept. on Proj. RAND. Available copy will not permit fully legible reproduction.

Descriptors: (*Political science, Indonesia), (*Indonesia, Military government), Officer personnel, Government-(Foreign), History, Military personnel, Military training, Military organizations, Communism, Guerrilla warfare, Economics.

Contents:
Origins of the officer corps
Guerrillas, rebels, and veterans
Ideology and politics
Pattern of civil-military relations
Officer corps's movement into politics
Toward civil war
Seeds of militarism
Mission of the officer corps
Tentative balance sheet.

PB-167 935 Field 5G, 9B
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Machine Translation Project.
THE NATURE OF THE MACHINE TRANSLATION PROBLEM,
by Sydney M. Lamb. Jan 63, 28p
Unclassified report

Presented at the Conference on Mechanical Translation and its Implications in Chinese Language Teaching and Learning, held in conjunction with the meeting of the Modern Language Association, December 1962, Washington, D. C.

Descriptors: (*Machine translation, Theory), (*Language, Machine translation), Digital computers.

PB-167 936 Field 5G, 9B
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Mechanolinguistics Project.
STRATIFICATIONAL LINGUISTICS AS A BASIS FOR MECHANICAL TRANSLATION,
by Sydney M. Lamb. Mar 64, 42p
Unclassified report

Prepared for presentation at the U. S.-Japan Seminar on Mechanical Translation, Tokyo, 20-28 April 1964. Supported by NSF.

Descriptors: (*Machine translation, Language), (*Language, Machine translation), Programming-(Computers), Communication theory.

PB-167 937 Field 5G
CFSTI Prices: HC$1.00 MF$0.50

Edinburgh Univ. (Scotland). Dept. of Phonetics.
THE SYNTHESIS OF A LONG PIECE OF CONNECTED SPEECH ON PAT,
by Elizabeth Uldall and J. K. Anthony. 1957, 11p
Unclassified report

Descriptors: (*Speech, Intelligibility), (*Speech representation, Analysis), Throat, Sound, Audiofrequency, Great Britain.

The paper describes the synthesis of a long (45 seconds) piece of connected speech, Aesop's fable of 'The North Wind and the Sun', as read by Mr. David Abercrombie. Mr. Abercrombie is a speaker of 'R.P.' English, and is a practiced lecturer and broadcaster. The reading was in a rather slow, formal public-speaking style, about 3.75 syllables per second, counting in pauses. The synthesis of a speech longer than a single sentence was done for several reasons: (1) to see the effects on intelligibility of a considerable amount of context; (2) to synthesize sounds in a variety of contexts of environment, including stress environment; and (3) to evolve an efficient system and obtain dexterity in preparing large amounts of material.

PB-167 938 Field 5G
CFSTI Prices: HC$1.00 MF$0.50

Edinburgh Univ. (Scotland). Dept. of Phonetics.
TEMPO AND TRANSITIONS,
by J. Kelly, J. K. Anthony, and Elizabeth Uldall. 1957, 10p
Unclassified report

Descriptors: (*Speech, Intelligibility), (*Speech representation, Analysis), Sound, Audiofrequency, Great Britain.

PB-167 940 Field 5B, 9B, 5G
CFSTI Prices: HC$1.00 MF$0.50

Comparative Systems Lab., Western Reserve Univ., Cleveland, Ohio.
PURPOSE AND OBJECTIVES OF THE COMPARATIVE SYSTEMS LABORATORY,
by A. J. Goldwyn. Aug 64, 25p
Technical rept. no. CSL TR-1
Grant PHS FR00118 01A1
Unclassified report

Prepared for presentation at the Congresso Internazionale Documentazione Informazione Scientifico Technica, Rome, Italy, 7 Feb 64.

Descriptors: (*Information retrieval, Test methods), Vocabulary, Medicine, Machine translation, Training, Subject indexing.

Modern documentation studies concentrate on system analysis and evaluation, research in the past and present nature of scientific communication, and training. The Comparative Systems Laboratory (CSL) at Western Reserve is planned to isolate and to test the component parts of an IR system; to study the concept of relevance; to collect information on the medical vocabulary (-ies); and to investigate certain areas of automatic language processing. Experimental design has included defining components and establishing measures for evaluation. Close liaison with potential user groups will provide 'real' questions and evaluation for the actual testing phase. The articulation of a training program with the CSL will enhance its long-term contribution to the research community. (Author)

PB-167 942 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Comparative Systems Lab., Western Reserve Univ., Cleveland, Ohio.
A USE FOR THE TECHNIQUES OF STRUCTURAL LINGUISTICS IN DOCUMENTATION RESEARCH,
by Jessica S. Melton. Sep 64, 23p
Technical rept. no. CSL-TR-4
Grants PHS FR00118 01A1; NSF G24488
Unclassified report

Prepared for presentation at the International Study Conference on Classification Research, Elsinore, Denmark, 14-18 Sep 64.

Descriptors: (*Subject indexing, Analysis), (*Language, Subject indexing), (*Information retrieval, Subject indexing), Classification, Data storage systems.

Index language (the system of symbols for representing subject content) is considered as a separate component and a variable in an information retrieval system. It is suggested that for purposes of testing, comparing and evaluating index language, the techniques of structural linguistics may provide a descriptive methodology by which all such languages (hierarchical and faceted classification, analytico-synthetic indexing, traditional subject indexing, indexes and classifications based on automatic text analysis, etc.) could be described and compared on a common basis. (Author)

PB-167 943 Field 5B, 9B
CFSTI Prices: HC$1.00 MF$0.50

Comparative Systems Lab., Western Reserve Univ., Cleveland, Ohio.
THE PLACE OF INDEXING IN THE DESIGN OF INFORMATION SYSTEMS TESTS,
by A. J. Goldwyn. Aug 64, 12p
Technical rept. no. CSL TR-3 Unclassified report
Grant PHS FR00118 01A1
Prepared for presentation at the Annual American Documentation Institute Convention, Chicago, Ill., Oct 63.

Descriptors: (*Information retrieval, Test methods), (*Subject indexing, Effectiveness).

Comparison of indexing techniques is difficult because current methodology distorts the role of indexing and its influence on total system design. Tests planned to evaluate indexing both as a variable and as a source of variation will hopefully lead to more realistic appraisals of comparative system performance. (Author)

PB-167 945 Field 5H, 9B
CFSTI Prices: HC$1.00 MF$0.50

Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
AN OUTLINE OF THE REQUIREMENTS FOR A COMPUTER-AIDED DESIGN SYSTEM,
by Steven Anson Coons. 1963, 6p
Contract AF33 600 42859 Unclassified report

Pub. in Proceedings, Spring Joint Computer Conference, p299-304 1963. Available copy will not permit fully legible reproduction.

Descriptors: (*Systems engineering, Computers), (*Computers, Systems engineering), Pattern recognition, Design, History, Humans.

The computer-aided design system is viewed as a chain of events beginning with an original concept envisioned by a design engineer and culminating in the production of a finished device. This man-machine combination would use the creative and imaginative powers of the man and the analytical and computational powers of the machine, each with the greatest possible economy and efficiency.

PB-167 948 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Engineers Joint Council, New York.
INFORMATION RETRIEVAL THESAURI,
by Eugene Wall. Nov 62, 24p Unclassified report

Descriptors: (*Information retrieval, Instruction manuals), (*Subject indexing, Information retrieval), Vocabulary, Search theory, Effectiveness, Word association, Data storage systems.

Purposes of an information retrieval thesaurus are enumerated and the characteristics required to achieve the purposes are described. The information retrieval thesaurus is shown to combine the techniques of library cross-referencing and thesaurus term-grouping. A brief history of the information retrieval thesaurus is provided, and reasons for calling such a tool 'thesaurus' are set forth. Twenty-five references are made to earlier publications concerned with information retrieval thesauri. A detailed example is presented wherein results obtained by searching with and without a thesaurus are quantitatively compared. (Author)

PB-167 949 Field 5G
CFSTI Prices: HC$6.00 MF$1.50

Cambridge Language Research Unit (England).
SYNONYMY AND SEMANTIC CLASSIFICATION.
Doctoral thesis,
by K. Sparck Jones. 1964, 270p Rept. no. M.L.-170
Unclassified report

Research supported by National Science Foundation, Washington, D. C.

Descriptors: (*Language, Analysis), Vocabulary, Classification, Dictionaries, Machine translation.

The character and function of synonymy in natural language is examined. The analysis of the role of synonymy in the structure of vocabulary is worked out in practical experiments in constructing a dictionary by classifying sets of synonymous uses. It is supported by the hypothesis, which is derived from a study of four models of the way in which linguistic symbols function, that synonymy is a fundamental feature of natural language. The way in which a semantic classification is applied in selecting the correct uses of words in discourse, given that words may have several uses by themselves but have only one use in text, is discussed.

PB-167 950 Field 5G
CFSTI Prices: HC$6.00 MF$1.50

Indiana Univ., Bloomington. Linguistics Research Proj.
LINGUISTIC ANALYSIS OF ENGLISH.
Final rept.,
by F. W. Householder, Jr. Feb 65, 259p
Grant NSF GS108
Unclassified report

Descriptors: (*Language, Analysis), Classification, Computers, Punched cards, Information retrieval, Machine translation, Dictionaries.

Contents:
Studies in transformational syntax
Distributional analysis and the computer
Investigation of verb-noun co-occurrence
A transformational grammar of Chinese converted from a stratificational grammar.

PB-167 951 Field 5A, 5D
CFSTI Prices: HC$2.00 MF$0.50

Westat Research Analysts, Inc., Bethesda, Md.
QUALITY RATING OF PATENT EXAMINATION IN THE UNITED STATES PATENT OFFICE.

Summary rept.,
by E. C. Bryant and P. J. Terragno. Apr 65, 31p
Rept. no. WRA-PO-15
Contract C3 65

Unclassified report

Descriptors: (*Patents, Classification), (*Quality control, Patents), Professional personnel, Effectiveness, Management engineering, Information retrieval, United States government.

PB-167 953 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

European Scientific Data Processing Center, Ispra (Italy).
UBER DIE FORMULIERUNG VON SCHLAGWORTEN FUR EINE SICHTLOCHKARTEI ('RETRIEVAL ABSTRACT UND STRUKTURREFERAT'),
by Dorothea Geinitz. 20 Aug 62, 9p

Unclassified report

Pub. in Nachrichten fuer Dokumentation 1962. Text in German.

Descriptors: (*Information retrieval, Abstracting), (*Abstracting, Vocabulary), Indexes, Documentation, West Germany.

PB-167 967 Field 5G
CFSTI Prices: HC$3.00 MF$0.75

Ohio State Univ. Research Foundation, Columbus.
A CONDENSED ACCOUNT OF SYNTACTIC ANALYSIS OF MANDARIN. CHINESE GRAMMARS AND THE COMPUTER AT THE OHIO STATE UNIVERSITY. CONTRASTIVE STRESS AND EMPHATIC STRESS. ENTAILMENT RULES IN A SEMANTIC THEORY.
Proj. on Linguistic Analysis,
by Anne Y. Hashmoto, Leroy F. Meyers, James Yang, John H. T. Lu, and Charles J. Fillmore. May 65, 92p
Rept. nos. 10, 1685-3
Grant NSF GN174

Unclassified report

Descriptors: (*Language, Analysis), China, Computers, Programming(Computers).

A survey of research work done in the field of Mandarin grammar on the Project on Linguistic Analysis at the Ohio State University is presented. Problems discussed include those of different grammatical categories such as aspect markers, adjectives, existential and possessive verbs, indefinite pronouns, numerals etc., and of diverse simple as well as complex constructions such as resultative verbs, the BA, the BEI, the negative, the comparative, the modifying clause, the conjunction of NP and of VBP, the Yes-No question and answer, etc. The main body of the paper is devoted to the presentation of the nature and implications of the more significant of these miscellaneous problems.

PB-167 968 Field 5A
CFSTI Prices: HC$6.00 MF$1.25

Stanford Univ., Calif. Graduate School of Business.
INVENTORY MODELS IN WHICH STOCKOUTS INFLUENCE SUBSEQUENT DEMAND,
by Benjamin L. Schwartz. May 65, 226p
Technical rept. no. TR-12
Grant NSF GS552

Descriptors: (*Inventory control, Mathematical models), (*Stock level control, Mathematical models), Commerce, Costs, Management engineering, Probability, Stochastic processes.

An investigation is conducted into a class of inventory models that offer an original treatment of stockout penalties. Previous investigations have considered a penalty cost to be incurred by the firm, when the demand for a commodity exceeds the supply. This cost is generally assumed proportional to the amount of unsatisfied demand. Such an interpretation is sometimes appropriate, e.g., when the exoess demand is met by obtaining a priority shipment. However, when loss of goodwill is involved, it is not apparent how a stockout penalty coefficient can be determined. In this dissertation the approach taken is to assume that the impact of loss of goodwill is not an immediate expense, but rather a subsequent effect, due to the disappointed customer changing his ordering pattern. The demand placed on the firm by a typical customer after meeting a stockout condition is assumed to be below that placed by one who was not disappointed. Models with this property are termed Perturbed Demand, abbreviated PD.

PB-167 971 Field 5B
CFSTI Prices: HC$2.00 MF$0.50

Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
STUDIES IN THE METHODOLOGY OF MEASURING INFORMATION REQUIREMENTS AND USE PATTERNS: QUESTIONNAIRE,
by F. J. Wuest. May 65, 41p Rept. no. 1
Grant NSF GN22

Unclassified report

Descriptors: (*Information retrieval, Scientific personnel), (*Scientific research, Information retrieval), Reports, Professional personnel, Analysis, Data, Punched cards, Engineering personnel.

The report is the first in a series on the comparative merits of different research methods used for the determination of information-use patterns of scientists. In this phase of the research a questionnaire is used as the means to gather data about (a) the training, experience and professional interests; and (b) the information-use habits of all members (faculty and graduate students) of a university Department of Metallurgical Engineering and a Department of Chemistry. All members of both departments were used as subjects in this and all other phases of the research. Responses to the questionnaire were coded and transferred to punched cards for computer data processing. Salient features of the analysis of information-use patterns are presented, including rating of information channels and journals according to importance, evaluation of the usefulness of scientific meetings and frequency of use of various informal information channels.

PB-167 972 Field 5B
CFSTI Prices: HC$4.00 MF$0.75

Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
METHODS OF STUDYING THE PATTERNS OF INFORMATION USE BY SCIENTISTS AND ENGINEERS: QUESTIONNAIRE MODEL, APPENDIX.
Mar 65, 105p Rept. no. 1 Unclassified report
Grant NSF GN22
See also PB-167 971.

Descriptors: (*Information retrieval, Scientific personnel), (*Scientific research, Information retrieval), Psychometrics, Reports, Professional personnel, Engineering personnel.

Questionnaire used in a study of what information scientists need and how they go about finding it.

PB-167 973 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Lehigh Univ., Bethlehem, Pa. Center for the Information Sciences.
STUDY OF THEORIES AND MODELS OF INFORMATION STORAGE AND RETRIEVAL: TOPOLOGY AND DOCUMENT RETRIEVAL OPERATIONS,
by Donald J. Hillman. 1 Jul 65, 18p
Rept. no. 9
Grant NSF GN283

Unclassified report

Descriptors: (*Information retrieval, Topology), (*Data storage systems, Theory), Algebras, Search theory, Mathematical models, Set theory, Operations research.

A topological theory of document retrieval operations is clarified in a number of respects. Certain criticisms are answered, and the relations of a finite topological space to a Boolean algebra and a closure algebra established. The fundamental position of metric spaces in document retrieval theory is explored, and the problem of constructing an appropriate model for non-static document collection is re-examined. (Author)

PB-167 993 Field 5C, 21D, 11H
CFSTI Prices: HC$4.00 MF$1.00

RAND Corp., Santa Monica, Calif.
PRICES OF REFINED PETROLEUM PRODUCTS IN THE U. S. S. R., 1928-1950,
by Nancy Nimitz. 26 May 55, 122p Memo. no. RM-1497
AD 90 550

Unclassified report

Rept. on Proj. RAND
Available copy will not permit fully legible reproduction.

Descriptors: (*Petroleum, Costs), (*Costs, Petroleum), (*USSR, Petroleum), Economics, Fuel oil, Gasoline, Lubricants.

This study of petroleum products prices in the Soviet Union during the period 1928-1950 is one of a series of studies of Soviet wholesale prices which will ultimately be used in conjunction with production data in current ruble values for the purpose of measuring rates of change in the output of the various economic sectors in the USSR. The study at hand indicates that petroleum products prices were four and one-half times as high in 1950 as they were in 1928. The principal problems encountered in making this study were, first, to compute a price applicable to the Soviet Union as a whole when data on regional prices only were available, and second, to match prices quoted at point of origin with other prices quoted at point of destination. (Author)

PB-168 000 Field 5B, 5D
CFSTI Prices: HC$2.00 MF$0.50

Westat Research Analysts, Inc., Bethesda, Md.
EVALUATION OF INFORMATION RETRIEVAL SYSTEMS IN PATENT OFFICE ENVIRONMENTS.
PART I. STATISTICAL CONCEPTS.
Research rept.,
by Edward C. Bryant. Feb 65, 39p Unclassified report

Descriptors: (*Patents, Information retrieval), (*Information retrieval, Statistical analysis), Costs, Documentation, Subject indexing, Search theory, Probability, Decision making, Mathematical models, United States Government.

The report is devoted to the evaluation of information retrieval systems, with particular reference to a patent office environment. Some reference is made to simple statistical concepts. Attention is devoted to matters of experimental design and the inferences which can (or cannot) be drawn from experimental data.

PB-168 075 Field 5J, 5E
CFSTI Prices: HC$2.00 MF$0.50

Army Medical Research Lab., Fort Knox, Ky.
Psychology Dept.
A PRELIMINARY INVESTIGATION OF THE EFFECTS OF WHOLE-BODY VIBRATION AND NOISE.,
by Michel Loeb, Thomas A. Barron, and Eugene S. Burda. 12 Nov 54, 31p Rept. no. 145
Proj. 6 95 20 001, Task AMRL S3
AD 47 142

Unclassified report

Descriptors: (*Vibration, Psychophysiology), (*Noise, Psychophysiology), Reaction(Psychology), Reflexes, Visual acuity, Physiology, Measurement, Thresholds-(Physiology), Psychomotor tests, Blood pressure, Pulse rate, Electrolytes(Physiology), Urine, Excretion, Performance(Human), Sound, Human engineering.

A number of psychophysiological measures were taken on 16 subjects before, during and after exposure to 98 db. recorded platform noise and 2 levels of 20 cps. vibration. Visual acuity was progressively impaired with increasing amplitude during vibration. Manual tremor of a supported hand was not significantly altered by light vibration, but there was a considerable and significant increase under heavy vibration. Other measures did not change significantly with the experimental conditions. (Author)

06. Biological and Medical Sciences

AD-438 001 Field 6P, 5E
CFSTI Price: HC$3.00

Human Resources Research Office, George Washington Univ., Washington, D. C.
MOONLIGHT AND NIGHT VISIBILITY.
Research memo.
by Thomas F. Nichols and Theodore R. Powers.
Jan 64, 60p
Contract DA44 188ARO2
N64 25364

Unclassified report

Rept. on Task SWINGSHIFT.
Research done in cooperation with Army Training Center Human Research Unit, Monterey, Calif.

Descriptors: (*Night sky, Visibility), (*Visibility, Night sky), Visual acuity, Vision, Adaptation(Physiology), Detection, Targets, Target discrimination, Target recognition, Astronomical data, Moon, Light, Intensity, Performance(Human), Military personnel, Visual perception, Twilight, Human engineering.

A discussion of published data and information relevant to visibility under low levels of natural illumination is presented. Those changes that occur in the nature and intensity of light between sunset and sunrise are described and related to the visibility of objects of military significance. Six field studies of night target detection are reviewed and assessed as to comprehensiveness in terms of a set of factors that affect visual perception. Suggestions for future research are offered and procedures for the preparation of moon diagrams and charts that provide comprehensive information on the potential availability of moonlight are described.

AD-448 763 Field 6P
CFSTI Prices: HC$3.00

Bascom Palmer Eye Inst., Univ. of Miami, Fla.
HUMAN ELECTRORETINOGRAPHY AS A GAUGE OF VISUAL PERFORMANCE.
Annual progress rept. no. 2, 1 Jun 63-1 Jun 64, by Thorne Shipley. 1 Jun 64, 78p
Contract DA49 193MD2344 Unclassified report
N64 32379
Available copy will not permit fully legible reproduction.

Descriptors: (*Visual acuity, Measurement), (*Retina, Visual acuity), Electronic recording systems, Pathology, Photosensitivity, Adaptation(Physiology), Night vision, Diseases, Thresholds(Physiology), Children, Test equipment, Computers, Statistical analysis.

A report on the ERG in the first day of life is noted to be in press. The application of the ERG to children in nutritional surveys is felt to be its major strength. A new apparatus is described permitting the plotting of the change in the central scotoma as a function of time in the dark. A statistical analysis is presented of the ERG in 100 normal eyes. The question is raised concerning the possibility of false negative ERG responses. The Cordis portable apparatus was tested in the field, powered by a 12 volt car battery, and it was found to be entirely satisfactory. A small sample of rare night blind patients (three with entirely normal photopic acuity) has been obtained and extensively studied. Within that sample, a close correlation between adaptometric curves and the ERG was not found. Further intensive work is planned with these patients to explore ERG correlations with other definitions of night vision besides the adaptometric ones. A physiological computer (Neurac) has been in operation for about two months and first results are reported. (Author)

AD-456 652 Field 6P
CFSTI Prices: HC$1.00

Georgetown Clinical Research Inst., Washington, D. C.
STUDIES ON AGING IN AVIATION PERSONNEL,
by Arthur E. Wentz. Aug 64, 15p
AM 64-1 Unclassified report

Descriptors: (*Aviation personnel, Aging(Physiology)), Medical research, Human engineering, Physiology, Pathology, Psychophysiology, Pharmacology, Ballistocardiography, Electrocardiography, Cardiovascular system, Respiratory system, Neurology, Vision, Hearing, Blood coagulation, Metabolism, Performance tests, Aviation medicine.

FAA aviation medical scientists are studying clinical aspects of aging in aviation personnel, Georgetown Clinical Research Institute, Georgetown University Medical Center, Washington, D. C. Investigative work is in the cardiovascular, neurological, pulmonary, vision and auditory, and the biochemical systems. Behavioral tasks are incorporated in the individual survey. Subjects for studies are selected from aviation personnel. Significant numbers for each 10-year age group will be examined annually for buildup of individual profiles. Consecutive studies at the Institute should develop techniques for rating physiological aging in individuals; for evaluating and detecting pathological states at earliest age; and to aid in formulating physical standards by physiological rather than chronological age, in aviation personnel. (Author)

AD-457 733 Field 6S, 5J, 13B
CFSTI Price: HC$5.00

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
SYMPOSIUM, REVIEW OF RESEARCH ON MILITARY PROBLEMS IN COLD REGIONS,
ed by Charles R. Kolb and Fritz M. G. Holmstrom.
Dec 64, 169p AAL-TDR-64-28 Unclassified report
Prepared for presentation at the Alaskan Science Conference (15th), American Association for the Advancement of Science, College, Alaska, 31 Aug - 4 Sep 64.

Descriptors: (*Arctic regions, Armed forces operations), (*Military personnel, Arctic regions), Symposia, Military medicine, Military psychology, Polar regions, Alaska, Construction, Materials, Brittleness, Military facilities, Sanitary engineering, Water supplies, Communication systems, Trafficability, Protective clothing, Performance(Human), Stress(Physiology), Stress(Psychology), Snow.

Contents: A philosophy for military research and development in Alaska and other Arctic Regions; Notes on the physical environment of Alaska; Major army operational problems in cold regions; Materials engineering for cold regions and the brittle fracture; Military construction problems in Alaska; Arctic and subarctic sanitation in military field operations; Trafficability of snow and muskeg; Summary of water supply problems in Alaska; Long distance radio communications in the Polar Regions; Summary of army environmental research in Alaska; Life sciences research approach to improved military effectiveness in the Arctic; The Arctic soldier: possible research solutions for his protection; Enhancing the effectiveness of the individual in the arctic through clothing and equipment; Effect of air movement on atmospheric cooling power; Effect of Arctic isolation on human performance.

N65-17879 Field 6S
CFSTI Prices: HC$1.00 MF$1.25

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
AEROSPACE MEDICINE AND BIOLOGY; A CONTINUING BIBLIOGRAPHY.
Jan 65, 175p NASA-SP-7011 (06)
Unclassified report

Descriptors: (*Space medicine, Bibliographies), (*Space biology, Bibliographies).

N65-18500 Field 6S
CFSTI Prices: HC$4.00 MF$1.00

Texas Inst. for Rehabilitation and Research, Houston, Tex.

THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART II. EXPERIMENTAL DESIGN,
by C. Vallbona, F. B. Vogt, D. Cardus, and W. A. Spencer. Mar 65, 109p
Contract NAS9 1461
NASA CR-172

Unclassified report

Descriptors: (*Medical research, Relaxation-(Physiology)), (*Relaxation(Physiology), Space medicine).

N65-19038 Field 6S
CFSTI Prices: HC$1.00 MF$0.75

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
AEROSPACE MEDICINE AND BIOLOGY; A CONTINUING BIBLIOGRAPHY.
Feb 65, 104p NASA-SP-7011 (08)

Unclassified report

Descriptors: (*Space medicine, Bibliographies), (*Space biology, Bibliographies).

N65-19903 Field 6S
CFSTI Prices: HC$6.00 MF$1.25

Stanley Aviation Corp., Denver, Colo.
A STUDY OF THE DYNAMIC MODEL TECHNIQUE IN THE ANALYSIS OF HUMAN TOLERANCE TO ACCELERATION.
Final rept.
Mar 65, 215p
Contract NASr37
NASA TN-D-2645

Unclassified report

Descriptors: (*Acceleration tolerance, Mathematical models).

N65-21159 Field 6S
CFSTI Prices: HC$4.00 MF$0.75

Texas Inst. for Rehabilitation and Research, Houston, Tex.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART VIII. THE EFFECT ON THE CARDIOVASCULAR TOLERANCE TO PASSIVE TILT,
by C. Vallbona, D. Cardus, F. B. Vogt, and W. A. Spencer. Apr 65, 94p
Contract NAS9 1461
NASA CR-178

Unclassified report

Descriptors: (*Relaxation(Physiology), Cardiovascular system), (*Cardiovascular system, Tolerances-(Physiology)).

N65-22614 Field 6S
CFSTI Prices: HC$1.00 MF$1.00

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
AEROSPACE MEDICINE AND BIOLOGY; A CONTINUING BIBLIOGRAPHY.
Mar 65, 137p NASA-SP-7011 (09)

Unclassified report

Descriptors: (*Space medicine, Bibliographies), (*Space biology, Bibliographies).

N65-22615 Field 6S
CFSTI Prices: HC$1.00 MF$0.75

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
AEROSPACE MEDICINE AND BIOLOGY; A CONTINUING BIBLIOGRAPHY.
Apr 65, 117p NASA-SP-7011-(10)

Unclassified report

Descriptors: (*Space medicine, Bibliographies), (*Space biology, Bibliographies).

N65-23171 Field 6K, 22A, 22B
CFSTI Prices: HC$6.00 MF$1.25

Airesearch Mfg. Co., Los Angeles, Calif.
STUDY OF THE THERMAL PROCESS FOR MAN-IN-SPACE,
by W. L. Burriss. Apr 65, 222p
Contract NASw1015
NASA CR-216

Unclassified report

Descriptors: (*Astronauts, Heat transfer), (*Heat transfer, Astronauts), (*Space environmental conditions, Heat transfer), Spacecraft, Spacecraft cabins, Pressure suits, Earth, Moon, Mars, Programming(Computers).

Patent 3,189,023 Field 6L

BLOOD PRESSURE INDICATING DEVICE.
Patent assigned to AEC,
by Paul Salz, Marvin B. Bacaner, and Nicholas W. Yanni. 15 Jun 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Blood pressure, Recording systems), (*Acceleration tolerance, Blood pressure), Medical equipment, Electrical equipment, Pulse rate, Transducers, Oscillation, Blood vessels, Patents.

The instrument is utilized to determine the physiological responses of a subject undergoing the sudden and intense acceleration attending the launching of a rocket. The device detects and translates the arterial pulse wave oscillations into an electrical signal which represents blood pressure. A transducer is used to detect the oscillations. The pressure transducer is placed in intimate contact with the blood vessel.

Patent 3,189,405 Field 6L

DECONTAMINATING DEVICE AND FOG GENERATOR.
Patent assigned to Agriculture,
by Robert A. Fulton and Alfred H. Yeomans. 15 Jun 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Aerosol generators, Decontamination), (*Hospitals, Decontamination), (*Decontamination, Hospitals), Controlled atmospheres, Formaldehyde, Sprays, Patents.

The fog generator dispenses a decontaminating agent, such as formalydehyde, within an enclosure, whereby it is possible to treat the contained atmosphere, as well as the walls, ceiling, and floor of a hospital room. The device has a timer for activating the spraying operation at a predetermined time.

Patent 3,190,331 Field 6H

METHOD FOR PIERCING PEAS.
Patent assigned to Agriculture,
by Edison Lowe and Everett L. Durkee. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Dehydrated foods, Preparation), (*Vegetables, Dehydrated foods), Evaporation, Moisture, Patents.

The method relates to the piercing of fresh green peas. In preparing dehydrated peas, the peas are preferably pierced prior to the application of the drying procedure. The piercing is advantageous in that evaporation of moisture can occur at an acceptable rate. The peas are impaled on and removed from the piercing device solely by the action of fluid pressure.

Patent 3,190,757 Field 6H

PREPARING A FLUFFED PRODUCT FROM MAPLE SUGAR SYRUP.
Patent assigned to Agriculture,
by Joseph C. Underwood, Sr. and Aaron E. Wasserman.
22 Jun 65
Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Food, Preparation), Carbohydrates, Fatty acids, Mixtures, Processing, Patents.

The fluffed maple or other sugar products are prepared by heating a mixture of about 75 parts sugar, about 25 parts water, and about 1 part of a pure monoglyceride selected from the group consisting of monoglycerides of saturated and unsaturated C12 and C20 monocarboxylic fatty acids and mixtures thereof, for a time sufficient to dissolve all the sugar and to a temperature sufficient to melt all the monoglyceride, and blending the mixture with incorporation of air until the desired consistency is obtained. Maple topping, maple icing, maple confections, cane sugar icing and corn sugar topping products are disclosed in examples.

Patent 3,192,054 Field 6H, 18D

FOOD IRRADIATOR AND METHOD.
Patent assigned to AEC,
by Otto A. Kuhl and Adolph B. Oltmann. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Irradiated foods, Processing), Packaging, Pasteurization, Fishes, Food, Preservation, Preservation, Radiological dosage, Shielding, Gamma rays, Patents.

A method and apparatus is provided for the irradiation pasteurization of food packages of uniform size and shape. Fish is eviscerated, scaled, filleted, trimmed and packaged. The packaged food is passed through a source of gamma rays.

PB-167 579 Field 6L

Chicago Medical School, Ill. Div. of Cardiovascular Research.
ELECTROMAGNETIC INTRACARDIAC SOUND GENERATOR,
by A. A. Luisada and R. Zalter. 1964, 1p
Grant PHS H5921
Report quoted in its entirety. Unclassified report

Descriptors: (*Sound generators, Heart), (*Heart, Sound generators), Cannulation, Calibration, Microphones, Medical equipment, Coils, Magnets, Sound, Extremely low frequency.

This device consists of a magnetic slug encased in a tiny iron cylinder over which a coil is wound. The frequency of current changes in the coil causes the magnetic slug to move back and forth, thus generating sound at a given frequency. This device can be introduced into the heart from a vein or artery following the customary methods of cardiac catheterization. Sounds generated by this instrument, which was built for calibration of sound, are recorded by a microphone applied on the chest wall. Vibrations above 400 cycles per second are well recorded by such microphone. Vibrations below 400 cps are poorly recorded. (Report quoted in its entirety).

PB-167 637 Field 6F
CFSTI Prices: HC$3.00 MF$0.75

Battelle Memorial Inst., Columbus, Ohio.
STATE-OF-THE-ART STUDY ON LEECH REPELLENTS,
by Walter H. Veazie, Jr., and Reynolds C. Overbeck.
10 Jul 63, 70p
Contract SD171, ARPA Order 324
AD 413 979
Rept. on Proj. AGILE. Unclassified report

Descriptors: (*Annelida, Pest control), (*Pest control, Annelida), Reviews, Insect repellants, Selection, Ecology, Geography, Bibliographies.

The report summarizes the information currently available on repellents for aquatic and terrestrial leeches. Information is provided that reflects early work on leech repellents, contemporary studies, and current activity. The geographical distribution of leeches is described. Areas which are considered to merit investigation, as well as chemicals which have promise of providing repellency, are identified; in this connection, techniques which have been used to evaluate repellency are discussed briefly. Also, recommendations of research effort that would fill some of the gaps, are presented. The organisms, repellents, and chemicals discussed are of direct medical or veterinary importance.

PB-167 688 Field 6S, 6K, 22A
CFSTI Prices: HC$7.00 MF$1.75

School of Aerospace Medicine, Brooks AFB, Tex.
LECTURES IN AEROSPACE MEDICINE,
3-7 FEBRUARY 1964.
1964, 332p
AD 445 253; N64 30712 Unclassified report

Descriptors: (*Space medicine, Symposia), Satellites(Artificial), Spacecraft, Astronauts,

Space crews, Manned spacecraft, Life support, Closed ecological systems, Space environmental conditions, Solar flares, Solar radiation, Stress-(Physiology), Adaptation(Physiology), Medical examination, Mars, Lunar surface vehicles, Aerospace craft, Extraterrestrial bases.

Contents: NASA Progress in Life Sciences; Naval Medical Support of the National Space Programs; Air Force Medical Support of the National Space Programs; New Information on Solar Flares and Space Radiation; Crew Structure in Future Space Missions; Establishment of Environmental Risks; Military Aspects of Satellite-to-Earth Visibility; Satellite-to-Satellite Visibility; Aeromedical Evaluation of Space Pilots; Simulator Studies of Space and Lunar Landing Techniques; The Crewman's Views on Rescue in Space; Development of the Apollo Portable Life Support Systems; Technological Assessment of Manned Orbiting Laboratories; Hazards in Oxygen Environments; Aeromedical Aspects of the XB-70 Aircraft; Spacecraft Environmental Systems Development Programs; Structure of the Lunar Surface; Use of Extraterrestrial Resources for Mars Basing; Solved and Unsolved Problems.

PB-167 807 Field 6C
CFSTI Prices: HC$6.00 MF$1.25

North Carolina Univ., Chapel Hill. Dept. of Botany.
ATLAS OF THE VASCULAR FLORA OF THE CAROLINAS,
by Albert E. Radford, Harry E. Ahles, and C. Ritchie Bell. Mar 65, 216p Tech. bull. no. 165
Grants NSF G9839, NSF G9692
Unclassified report

Descriptors: (*North Carolina, Plants(Botany)), (*South Carolina, Plants(Botany)), (*Plants(Botany), Distribution), Maps, Grasses, Trees.

The report shows, by means of dot maps on a county basis, the documented distribution of each species of vascular plant known to occur without cultivation in the Carolinas. The maps are arranged alphabetically by family, genus, and species within the major group sequence of Pteridophyta (Ferns and Fern Allies), Gymnospermae (Conifers), and Angiospermae (Flowering Plants). Species previously reported but of doubtful occurrence in the Carolinas are not mapped, but are listed separately. A total of 179 families, 943 genera, and 3235 species comprise the known vascular flora.

PB-167 847 Field 6E, 5B
CFSTI Prices: HC$3.00 MF$0.75

Biological Sciences Communication Project, George Washington Univ., Washington, D. C.
PEDIATRICS SERIALS. THEIR IDENTIFICATION AND CHARACTERISTICS,
by Charles W. Shilling and Mildred Benton. Apr 65, 54p BSCP-20-65
Grant NIH CM11711 02
Unclassified report

Descriptors: (*Periodicals, Medicine), (*Medicine, Children), (*Indexes, Medical research), Bibliographies, Information retrieval, Abstracting, Libraries, Subject indexing, Reports, Documentation, Psychiatry, Psychology.

Contents:
Analysis of pediatric serial characteristics
Complete title list
Ceased serials
Country of origin
Language of publication
Subject content
Frequency of issue
Birth rate
Abstract and index coverage
Type of sponsorship
Content characteristics

PB-167 914 Field 6L, 6E
CFSTI Prices: HC$1.00 MF$0.50

Arkansas Univ., Little Rock. Medical Center.
A MODIFICATION OF KIDNEY BIOPSY NEEDLE,
by John B. Nettles. 1965, 8p Unclassified report
Grants AMA462, NIH H4975

Descriptors: (*Medical equipment, Histological techniques), (*Histological techniques, Medical equipment), Tissues(Biology), Pathology, Surgical techniques, Kidneys, Neoplasms.

One of the standard tissue biopsy needles, the Franklin-Vim-Silverman needle, has been modified to permit the taking of a biopsy of the human kidney through lower abdominal incisions of the type used in gynecologic, obstetric and similar operations. The sme technic may be used with other type incisions and to biopsy other organs and tumor masses.

PB-167 932 Field 6C
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CONDITIONING OF PRIMATES FOR EXPERIMENTS. (Conditionnement des Primates pour l'Experimentation),
by Gerard Legeay, Michel Geneste, and Guy Brawers. Mar 65, 37p CEA-R-2714
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Monkeys, Laboratory animals), Biological laboratories, Sanitary engineering, Diet, Reproduction(Physiology), Mycobacterium tuberculosis, Vaccines, Diseases, Diplococcus pneumoniae, Diplococcus, Shigella, Protozoa, Worms, Nutrition, Metabolism.

The preparation of the monkey for experiments is one branch of zootechny applied to laboratory animals. The construction of a monkey-house at the Saclay Nuclear Research Centre has made it possible to study the hygiene rules necessary for obtaining subjects with relatively stable biological parameters. This hygiene includes: - prophylactic treatment, because the animals received lived originally in the wild state.
- a balanced diet, following modern dietetic standards.
- a habitat hygiene which recreates the original living conditions of the species. The possibility of reproduction has been used as a criterion of the efficiency of the methods applied. (Author)

PB-167 934 Field 6D, 9B
CFSTI Prices: HC$5.00 MF$1.25

Northwestern Univ., Evanston, Ill. Technological Inst.
A MULTICONTEXT PROBLEM SOLVING SYSTEM WITH NATURAL LANGUAGE INPUTS.
Rept. no. 1,
by David J. Kuck. Apr 63, 191p
Grant NSF G17951 Unclassified report

Report on Studies in the Simulation of Human Behavior.

Descriptors: (*Bionics, Digital computers), (*Reasoning, Artificial intelligence), Design, Input-output devices, Language, Computer logic, Algebra, Physics, Simulation, Programming(Computers), Pattern recognition.

This thesis discusses the design of a system for solving problems with a digital computer. The computer input is a description of the problem in English and the output is the numerical answer. Simple problems in algebra and physics in a variety of contexts are considered.

SB-403, Suppl. 1 Rev. Field 6H

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
FOOD PRESERVATION BY IRRADIATION.
Price list, selective bibliography of Government research repts. and translations for Jun 62-Feb 65.
Feb 65, 19p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Irradiated foods, Bibliographies), Nutrition, Containers, Storage, Packaging, Fruits, Vegetables, Meat, Ionization, Pasteurization, Toxins + antitoxins, Radiation effects, Dehydrated foods.

The bibliography lists 216 domestic and foreign references on food preservation by irradiation added to the CFSTI collection from June 1962 through February 1965. It includes research on long range nutritional properties of irradiated food; development of containers for irradiated foods; extension of storage life of fresh fruit and vegetables by ionizing radiation; aging of meat by irradiation; radiation sterilization of canned foods; destruction of food poisoning organisms in canned foods subjected to ionizing radiation; control texture changes in irradiated meats; radiation damage to food; application of radiochemistry techniques in food processing research; packaging requirements for radiation pasteurized foods; hydration of dried fruit; application of ionizing radiation to the sterilization of food and medical supplies; and the AEC and Army food irradiation program. For references on Food Preservation (Except by Irradiation) see SB-412 and SB-412 Supplements 1 and 2.

SB-412 Suppl. 2 Field 6H

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
FOOD PRESERVATION (EXCEPT BY IRRADIATION).
Price list, selective bibliography of Government research repts. and translations for Jun 62-Feb 65.
Feb 65, 15p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Food, Preservation), Pasteurization, Dehydrated foods, Freezing, Freeze drying, Nutrition, Packaging, Bibliographies.

The bibliography lists 213 reports and translations on food preservation (except by irradiation) added to the CFSTI collection from June 1962 through February 1965. It includes research on additives, sterilization, pasteurization, biochemical treatment, smoke and salt curing of foods; dehydration; freeze-drying; freezing and refrigeration.

SB-511 Suppl. 1 Field 6O, 6R

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
RADIOPROTECTIVE AGENTS.
Price list, selective bibliography of Government research repts. and translations for Feb 63-Apr 65.
Apr 65, 8p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Radioprotective agents, Bibliographies), (*Bibliographies, Radioprotective agents), Drugs, Whole body irradiation, Radiation effects, Radiobiology, Foods.

Lists 73 domestic and foreign references on radioprotective (anti-radiation) agents added to the CFSTI collection during the period February 1963 through April 1965. Includes reports on protective effects of natural foods and chemicals i. e. 2-mercaptoethylguanidine and its disulfide, carbohydrate dirivatives, strophanthin, isonicotinic and hydrazide, aminothiols.

TID-3580 Field 6R
CFSTI Prices: HC$3.00 MF$0.75

Division of Technical Information Extension (AEC), Oak Ridge, Tenn.
BIOLOGICAL APPLICATIONS OF GAMMA RADIATION, comp. by Helen L. Ward. Jan 65, 97p
Unclassified report

Descriptors: (*Gamma-rays, Biology), (*Medical research, Radiation effects).

07. Chemistry

AD-283 306 Field 7B, 7C
CFSTI Prices: HC$1.00

Naval Ordnance Lab., Corona, Calif.
A SURVEY OF BERYLLIUM CHLORIDE-ETHER AND BERYLLIUM CHLORIDE-AMINE COMPLEXES, by Frederick E. Brinckman, Jr., Neil R. Fetter, and Frances M. Peters. 15 Aug 62, 17p
Task RMMP7A 032 211 7F009 06 001
NAVWEPS 7227
Unclassified report

Descriptors: (*Beryllium compounds, Chlorides), (*Ethers, Complex compounds), (*Amines, Complex compounds), Organic nitrogen compounds, Pyridines, Metalorganic compounds, Hydrazine derivatives, Salts, Hydrogen compounds, Nuclear magnetic resonance, Infrared spectroscopy, Exchange reactions, Chemical reactions, Molecular weight.

A study has been made of the reactions of BeC12 with tertiary amines and diethyl ether and of the exchange reactions of the complexes formed. This study has led to the preparation of several hitherto unreported compounds: BeC12-etherate, a BeC12-pyridinate, and a BeC12-trimethylamine complex. The nitrogen base complexes decompose in a reaction previously unknown in beryllium chemistry. Elemental analyses, molecular weight data, infrared spectra, and NMR spectra are presented. (Author)

AD-295 632 Field 7C
CFSTI Prices: HC$3.00

Purdue Research Foundation, Lafayette, Ind.
PREPARATION OF PHOSPHONITRILE MONOMERS. I. PHOSPHONITRILE AMIDES AND ANILIDES. II. REACTION OF PHOSPHONITRILIC CHLORIDE TRIMER AND TETRAMER WITH ORGANOMETALLIC REAGENTS. III. PHOSPHONITRILIC ENOLATE ESTERS. IV. PARTIALLY SUBSTITUTED PHOSPHONITRILIC PHENYLESTERS AND THEIR POSITIONAL AND STEREO ISOMERS.
Final rept. for 16 Jan 56-30 Nov 62.
30 Nov 62, 54p
Contracts DA33 008ORD1156, DA33 008ORD2131,
Proj. 1359 Unclassified report
AROD 1395:10

Available copy will not permit fully legible reproduction.

Descriptors: (*Organic phosphorus compounds, Synthesis-(Chemistry)), (*Nitriles, Synthesis(Chemistry)), (*Phosphonitrile chlorides, Chemical reactions), Organic nitrogen compounds, Amides, Spectra(Infrared), Molecular structure, Metalorganic compounds, Indoles, Polymers, Esters, Spectra(Visible + ultraviolet), Nuclear magnetic resonance, Molecular isomerism.

AD-441 429 Field 7C, 11I
CFSTI Price: HC$1.00

Quantum, Inc., Wallingford, Conn.
HIGH TEMPERATURE POLAMINE RESINS.
Technical Progress rept. no. 1, 15 Mar-15 Jun 64,
by Raymond L. Taylor. 15 Jun 64, 24p
Contract Nobs90266, Proj. SR007 04 01, Task 1050
N64 27677
Unclassified report

Descriptors: (*Heat-resistant plastics, Synthesis-(Chemistry)), (*Amino plastics, Synthesis(Chemistry)), (*Amines, Heat-resistant plastics), Xylenes, Chlorine compounds, Aromatic compounds, Amides, Sodium compounds, Aldehydes, Phtalic acids, Organoboranes, Anilines, Molecular weight, Molecular structure, Stability, Solubility, Polymerization, Polymers.

A literature search was conducted to investigate work done with aromatic amine-organic chloride reactions and organo-sodium amide preparations from amines and amides. Polymers were synthesized from alpha, alpha-dichloro-p-xylylene and diamines of various molecular structures. Polymers with varying characteristics can be made from these materials. Polymers essentially linear in structure but of relative low molecular wt. appeared to be synthesized by the diamine/dichloride route. Extensive investigations of polyamine synthesis from sodium salts of amides and amines, and chlorides were conducted. Apparently successful methods were found for preparing sodium derivatives of amides and amines from both solid sodium amide and sodium/ammonia solution. Copolymers were prepared from disodium-N,N' -diacetyl-p-phenylenediamine and N,N' -disodium-p-phenylenediamine with alpha, alpha -dichloro-p-xylene. (Author)

AD-455 106 Field 7C, 11I
CFSTI Price: HC$3.00

Quantum, Inc., Wallingford, Conn.
HIGH TEMPERATURE POLYAMINE RESINS.
Technical progress rept. no. 3, 16 Sep-15 Dec 64,
by Raymond L. Taylor. 15 Dec 64, 51p
Contract Nobs90266, Proj. SR007 04 01, Task 1050
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Heat-resistant plastics, Synthesis-(Chemistry)), (*Amino plastics, Synthesis(Chemistry)), Polymerization, Condensation reactions, Organoboranes, Molding, Compatibility, Physical properties, Solvent action, Thermal properties, Electrical properties, Dielectric properties, Spectra(Infrared), Heat, Stability.

Several polyamine and polyimine type resins were prepared using condensation polymerization reactions. Molar ratios of reactants were varied to prepare resins with various degrees of solubility (for coating application) and moldability. The polyamines were found to be resistant to many chemicals and solvents. They are least resistant to mineral acids, being decomposed by both sulfuric and nitric acids. From the standpoint of thermal stability, polyimines stable up to 700 F are superior to polyamines which show weight losses of 10 to 20% in 24 hours at 600 F. Polyimines are infusible and insoluble, and as such cannot be molded or cast into films. Polyamines, however, can be processed in both ways. Carborane and neocarborane were synthesized and infrared analyses characteristic of these materials were obtained. Derivatives of these materials which can be incorporated into polyamine resins were prepared. (Author)

AD-461 106 Field 7C, 11I
CFSTI Price: HC$3.00

Quantum, Inc., Wallingford, Conn.
HIGH TEMPERATURE POLYAMINE RESINS.
Final rept. for 16 Mar 64-15 Mar 65,
by Raymond L. Taylor. 15 Mar 65, 83p
Contract Nobs90266, Proj. SR007 04 01, Task 1050
Unclassified report

Descriptors: (*Heat-resistant plastics, Synthesis-(Chemistry)), (*Amino plastics, Synthesis(Chemistry)), (*Amines, Heat-resistant plastics), Polymers, Polymerization, Sodium compounds, Anilines, Molecular weight, Molecular structure, Xylenes, Solubility, Thermal properties, Stability, Organoboranes, Aromatic compounds, Chlorine compounds, Amides, Anhydrides, Molding, Electrical properties, Condensation reactions.

A process for preparing copolymers from N, N'-disodium-N, N'-diacetyl-p-phenylene diamine and xylylene dichloride was established. Polymers that melt from 200 to 800 F and soluble in certain organic solvents were prepared. A polymine was prepared from p-phenylene diamine and terephthalaldehyde which exhibits good thermal stability up to 800 F and is insoluble in organic-solvents. Hydrogenations were unsuccessful. Polymers were made from alpha, alpha'-dichloro-p-xylene and diamines of various molecular structures. Polymers obtained with p-phenylene diamine were selected as the best candidate for investigation with thermal stability at approximately 500 F. Studies of cross-linking the polyamine with anhydrides and isocyanates were conducted. No significant improvement in properties over those of the pure resin was observed. Polyamines were found to be resistant to many chemicals and solvents. They are least resistant to mineral acids, being decomposed by both sulfuric and nitric acids. The electrical properties of polyamines and polyimines were found to be comparable to certain common commercial plastics. (Author)

COO-1197-12 Field 7B, 20B, 7D
CFSTI Prices: HC$3.00 MF$0.75

Kansas Univ., Lawrence. Dept. of Physics and Astronomy.

SELF-DIFFUSION OF THE SILVER ION IN PURE SILVER CHLORIDE,
by Max D. Weber. Nov 64, 63p
Contract AT(11-1)-1197
Unclassified report

Descriptors: (*Silver compounds, Chlorides), (*Diffusion, Silver).

N65-20481 Field 7D, 11B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
RATES OF HYDROGEN-GRAPHITE REACTION BETWEEN 1550 and 2260C,
by William A. Sanders. Apr 65, 9p NASA-TN-D-2738
Unclassified report

Descriptors: (*Hydrogen, Reaction kinetics), (*Graphite, Reaction kinetics).

N65-21166 Field 7B, 7D
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
METHOD OF DETERMINING CARBONATE ION IN SURFACE OF CRYSTALLINE SOLIDS BY MEANS OF MASS SPECTROMETRIC GAS ANALYSIS,
by Dumas A. Otterson and Myron O. Davies.
Apr 65, 7p NASA-TN-D-2764
Unclassified report

Descriptors: (*Carbonates, Mass spectroscopy), (*Mass spectroscopy, Carbonates).

N65-24384 Field 7D
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
VAPOR PRESSURE OF SODIUM FROM 0.5 TO 120 ATMOSPHERES,
by Kenneth J. Bowles and Louis Rosenblum.
May 65, 10p NASA-TN-D-2849
Unclassified report

Descriptors: (*Vapor pressure, Sodium), (*Sodium, Vapor pressure), Pressure.

ORNL-3773 Field 7E, 18J
CFSTI Prices: HC$2.00 MF$0.50

Oak Ridge National Lab., Tenn.
Adsorption of Protactinium on unfired Vycor Initial Hot-cell Experiments,
by J. G. Moore, J. H. Goode, and J. W. Ullmann.
Apr 65, 25p
Contract W-7405-ENG-26
Unclassified report

Descriptors: (*Protactinium, Adsorption), (*Reactor fuels, Protactinium).

Patent 3,189,644 Field 7C

C4-6 PERFLUORINATED GLYCOL DIESTERS OF TRIMETHYLACETIC ACID.
Patent assigned to Army,
by Jonathan L. Snead and Henry Gisser. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Carboxylic acids, Fluorination), (*Esters, Patents), Fluorine compound, Alcohols, Gylcols.

The fluoroalcohol esters exhibit good oxidation and thermal stability and have a wide liquidus range. The esters are prepared by the elimination of secondary and tertiary carbon-hydrogen bonds from the acid moiety of fluoroalcohol esters.

PB-167 734 Field 7D
CFSTI Prices: HC$2.00 MF$0.50

Georgia Inst. of Tech., Atlanta, Engineering Experiment Station.
STANDARDIZATION OF SURFACE PROPERTIES OF FINE PARTICLES.
Quarterly rept. no. 3,
by Clyde Orr, Jr., H. G. Blocker, and D. Jane Barrett. 30 Jan 54, 27p
Contract DA36 039SC42588, Proj. 3 99 15 022
AD 26 832
Unclassified report

Descriptors: (*Surface properties, Particles), (*Adsorption, Heat), Solids, Purification, Particle size, Standardization.

The surface properties of finely divided solid materials are evaluated. The present study is concerned primarily with heats of adsorption, i.e., the heat released at a solid's surface when a gas comes into contact with the solid. Particular attention was given to the purification of the gases used, to the purification of the surface upon which adsorption occurred and to the accurate measurement of pressure. Unsolved problems involve the regulation of the adsorbent temperature at several levels of temperature and minor leaks attributable to glass stopcocks. Major sources of error are believed to be overcome, however. (Author)

PB-167 738 Field 7D
CFSTI Prices: HC$1.00 MF$0.50

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
STANDARDIZATION OF SURFACE PROPERTIES OF FINE PARTICLES.
Quarterly rept. no. 1, 1 Apr-30 Jun 53,
by J. M. Dallavalle, Clyde Orr, Jr., and H. G. Blocker.
30 Jul 53, 16p
Contract DA36 039SC42588, Projs. 3 99 15 022, 152B
AD 016 835
Unclassified report

Descriptors: (*Particles, Surface properties), (*Surface properties, Particles), Gases, Adsorption, Thermal properties, Test equipment, Calorimeters, Thermodynamics, Charcoal, Powders, Nitrogen, Solids, Nickel.

This investigation had as its general objective an evaluation of the surface properties of finely divided solids such that the standardization of these properties may eventually be attained, and it had as its immediate objective a study of the heat released upon the adsorption of a gas by powders. A suitable instrument was devised for making

these heat of adsorption measurements, and a number of measurements were made. All indicate that the heat liberated upon the adsorption of a unit quantity of gas varies as the surface of the solid absorbent is covered. Surprisingly, the first small increment of gas adsorbed by cocoanut charcoal gives up a quantity of heat that seems to be approximately equal to the heat of liquefaction of the gas at that temperature, while later increments of adsorbing gas give up considerably greater increments of heat until the surface is covered with a monomolecular layer, at which conditions only heat equivalent to liquefaction is released. (Author)

PB-167 739 Field 7D
CFSTI Prices: HC$2.00 MF$0.50

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
STANDARDIZATION OF SURFACE PROPERTIES OF FINE PARTICLES.
Quarterly rept. no. 2,
by J. M. Dallavalle, Clyde Orr, Jr., H. G. Blocker, and D. Jane Barrett. 30 Oct 53, 30p
Contract DA36 039SC42588, Projs. 3 99 15 022, 152B
AD 021 860

Unclassified report

See also PB-167 738.

Descriptors: (*Particles, Surface properties), (*Surface properties, Particles), Gases, Adsorption, Thermal properties, Powders, Charcoal, Solids, Nitrogen, Nickel, Calorimeters, Thermodynamics.

This investigation had as its general purpose an evaluation of the surface properties of finely divided solids; its immediate objective is a study of heat of adsorption, i.e., the heat released upon the adsorption of a gas by a solid. Two completely different apparatus utilizing different principles were employed. Heat of adsorption measurements for the adsorption of nitrogen gas on charcoal at rather low temperatures indicated general agreement between the two methods. Heats of adsorption of nitrogen gas on a specially prepared nickel powder at low temperatures were also determined and are believed to be of the correct order of magnitude. A spreading of the experimental data, the source of which is not believed to be entirely experimental error, was evident, however. Additional work will be directed toward eliminating this source of error. (Author)

PB-167 749 Field 7D
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
SOLUBILITY OF AMMONIA IN HYDRAZINE,
by Paul A. Banas, Howard W. Kruse, and Eugene Lieber. 18 Jun 54, 14p Rept. no. NOTS-876
NAVORD 3337; AD 48 767

Unclassified report

Descriptors: (*Solubility, Measurement), (*Ammonia, Hydrazine), (*Hydrazine, Decomposition), Thermal properties, Pressure, Test methods, Test equipment, Experimental data.

Measurements of the solubility of ammonia in anydrous hydrazine were made at temperatures of 25, 30, 40, 50, 60, and 70C. Pressures employed ranged from slightly above the vapor pressure of hydrazine to approximately atmospheric pressure. The data are presented in terms of cc of NH3 per 100 g of solvent, g of NH3 per 100 g of solvent, the Bunsen coefficient, alpha, and the Ostwald coefficient, L. The solubility expressed as alpha varied from 57.71 at 25C to 16.49 at 70C. (Author)

PB-167 871 Field 7D, 12A
CFSTI Prices: HC$1.00 MF$0.50

Wisconsin Univ., Madison. Theoretical Chemistry Inst.
ON THE NATURE OF THE SPECTRUM OF THE TIME CORRELATION FUNCTION MATRIX FOR STOCHASTIC PROCESSES, AND STATISTICAL MECHANICS AND IRREVERSIBILITY,
by Frank C. Andrews. 6 May 65, 30p
Rept. no. WIS-TCI-94
Grant NSF G20725

Unclassified report

Descriptors: (*Statistical mechanics, Matrix algebra), (*Statistical functions, Statistical mechanics), Stochastic processes, Statistical distributions, Irreversible processes.

PB-167 872 Field 7D
CFSTI Prices: HC$4.00 MF$0.75

Cornell Univ., Ithaca, N. Y. Materials Science Center.
NUCLEAR MAGNETIC RESONANCE IN LIQUID HELIUM THREE NEAR THE MELTING CURVE,
by Harold Weinstock. Jun 62, 109p Rept. no. 41
Grant NSF G22034

Unclassified report

Also supported by ARPA.

Descriptors: (*Helium, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Helium), Isotopes, Isotope availability, Synthesis(Chemistry), Liquefied gases, Quantum mechanics, Cryogenics, Theory, Scientific research, Relaxation time, Solids.

The region of the liquid near the negative slope of the melting curve was investigated by nuclear magnetic resonance (NMR) using a blocked capillary method. By this method, a solid block of helium three was formed in the capillary fill line in thermal contact with the helium three cryostat. Since the experimental NMR chamber cooled much more slowly than the helium three cryostat, it was sealed off by the solid block in the capillary while the helium three within the chamber was entirely liquid. As the chamber was cooled further through contact to the He(3) refrigerator and then by adiabatic demagnetization, a solid-liquid mixture was formed. The amount of solid in the mixture could be expected to increase as the positive slope of the melting curve was traced out down to T(min). For temperatures less than T(min), the amount of solid could be expected to decrease. Finally, further cooling produced a temperature at which the chamber contained only liquid again. If the densities of liquid and solid helium three had not changed value appreciably 81, then the point of departure from the melting curve was expected to be nearly at the same pressure at which seal-off of the chamber occurred. Thus, the region of interest in the liquid was obtained.

PB-167 875 Field 7A, 11I
CFSTI Prices: HC$4.00 MF$1.00

Minnesota Univ., Minneapolis. Dept. of Chemical Engineering.
AN ANALYTIC STUDY OF THE STABILITY AND CONTROL OF AN ADDITION POLYMERIZATION REACTION SYSTEM,
by Robert B. Warden and Neal R. Amundson.
15 Jun 63, 134p
Grant NSF G19722

Unclassified report

Rept. on Theoretical Analysis of Chemical Reaction Systems.

Descriptors: (*Polymerization, Control), Chemical reactions, Stability, Polymers, Temperature, Molecular weight, Perturbation theory, Functions, Coolants, Tanks(Containers), Linear systems, Harmonic oscillators, Trajectories.

The stability of monomer terminated addition polymerization in a continuous stirred tank reactor under control based on the reactor temperature or monomer concentration or on a moment of the polymer molecular weight distribution is considered. After linearization about a steady state, the stability of the reactor for infinitesimal perturbations is discussed for various control modes regulating the coolant flow rate or the inlet monomer concentration. The only control which can stabilize the reactor under all conditions is proportional control of the coolant flow rate based on the deviation from the steady state reactor temperature. Stability for finite perturbations is analyzed by the direct method of Lyapunov. The growth of a limit cycle is studied by a Lyapunov-type analysis of the stability of limit cycles.

PB-167 958 Field 7D, 7B
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
A KINETIC STUDY OF THE REACTION OF WATER VAPOR AND CARBON DIOXIDE ON URANIUM (Cinetique de la Reaction de la Vapeur d'Eau et du Dioxyde de Carbone sur l'Uranium).
Doctoral thesis,
by Jean-Paul Santon. 16 Sep 64, 65p
Rept. no. CEA-R-2596
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Uranium, Chemical reactions), (*Water vapor, Uranium), (*Carbondioxide, Uranium), (*Reaction kinetics, Uranium), Gravimetric analysis, Powders, Films, Spheres, High-temperature research, Surface properties, Diffusion, France.

The kinetic study of the reaction of water vapour and carbon dioxide with uranium has been performed by thermogravimetric methods of temperatures between 160 and 410C in the first case, 350 and 1050C in the second. Three sorts of uranium specimens were used: uranium powder, thin evaporated films, and small spheres obtained from a plasma furnace. The experimental results led in the case of water vapour, to a linear rate of reaction controlled by diffusion of the lower temperatures, and by a surface reaction at the upper ones. In the case of carbon dioxide, a parabolic law has been found, controlled by diffusional processes. (Author)

PB-167 963 Field 7D
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
ANALYSIS OF SOLIDS BY SPARK SOURCE MASS SPECTROMETRY (Analyse des Solides au Spectrometre de Masse a Etincelles),
by Rene Stefani, Michel Desjardins, Jean Claude Brun, Ayme Cornu, and Robert Bourguillot.
May 65, 24p Rept. no. CEA-R-2757
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Spectrum analyzers, Mass spectroscopy), (*Mass spectroscopy, Spectrum analyzers), Sparks, Sources, Solids, Laboratory equipment, Test methods, Line spectrum, Impurities, France.

Spark source mass spectrometer MS7 has been designed to determine traces of impurities in solids without standards. An atlas of 12,000 lines, assembled in the Grenoble laboratory, allows a quick investigation of mass spectra, notwithstanding their complexity due to multiply charged and polyatomic darkening. Photometric measurements increase accuracy if calibration curve is known for each photoplate. Further, reproducibility is better, if random fluctuations of matrix'line darkening are corrected. So far, in a concentration range of 0,01 to 1 000 ppm (atomic), reproducibility is approximately 20 per cent, but absolute value of results depends on 'sensitivity coefficients'. (Author)

UCRL-7631-T Field 7E
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
THE USE OF RADIOACTIVE TRACERS IN MARKER MOVEMENT EXPERIMENTS,
by Ralph H. Condit, and J. Birch Holt.
16 Dec 63, 11p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Tracer studies, Oxidation), (*Oxidation, Radioactive isotopes).

UCRL-7741 Field 7C
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
COUPLING OF FLUOROALKYL IODIDES,
by Eugene R. Bissell. 28 Jan 64, 10p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Halogenated hydrocarbons, Chemical reactions).

UCRL-7962 Field 7D
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
Gallium Oxe -- A Versatile Compound in Spectrographic Procedures,
by W. Morris. 22 Jan 65, 12p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Gallium compounds, Oxides), (*Spectrum analyzers, Gallium compounds).

UCRL-11828 Field 7E
CFSTI Prices: HC$6.00 MF$1.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
NUCLEAR CHEMISTRY DIVISION ANNUAL REPORT, 1964,
ed. by J. M. Hollander, F. Reynolds, and B. B. Cunningham. Jan 65, 289p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Radiation chemistry, Nuclear physics), (*Radiochemistry, Nuclear physics).

08. Earth Sciences and Oceanography

AD-439 691-1 Field 8K
CFSTI Price: HC$7.00

Michigan Univ., Ann Arbor. Geophysics Lab.
HANDBOOK: WORLD-WIDE STANDARD SEISMOGRAPH NETWORK.
Revised ed.
by Donald O. Fries. Jul 64, 310p Unclassified report

Descriptors: (*Seismological stations, Handbooks), Seismology, Instrumentation, Structures, Specifications, Maps, Photographs, Graphics, Bibliographies.

This report is a compilation of information about each of the 90 stations in the World-Wide Cooperative Standard Seismograph Network as of July 1964. This information includes material on each station's location and facilities, environment, vault and pier construction, and instrumentation. Maps, diagrams, and photographs supplement the text. (Author)

N65-23712 Field 8E, 22B
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
DETERMINATION OF THE ELLIPTICITY OF THE EARTH'S EQUATOR FROM OBSERVATIONS ON THE DRIFT OF THE SYNCOM II SATELLITE,
by Carl A. Wagner. May 65, 66p NASA-TN-D-2759
Unclassified report

Descriptors: (*Astronomical geodesics, Synchronons satellites), (*Synchronous satellites, Geodesics).

PB-167 569 Field 8E, 9B
CFSTI Prices: HC$1.00 MF$0.50

Coast and Geodetic Survey, Washington, D. C.
USE OF THE COMPUTYPER IN LEVELING COMPUTATIONS,
by C. E. McCombs. Mar 64, 16p Unclassified report
Presented at the Annual Meeting of the American Congress on Surveying and Mapping (24th), held at Washington, D. C., 19 Mar 64.
Available copy will not permit fully legible reproduction.

Descriptors: (*Surveying, Special purpose computers), (*Special purpose computers, Surveying), Punched tape.

A Computyper is now in use in the Leveling Branch, Geodesy Division, Coast and Geodetic Survey. The Computyper is an electric writing machine connected to an electrically-controlled computing unit consisting of a calculator and an accumulator. The writing machine produces a typed copy of data, transmits data to the computing unit, and types results received from the computing unit, simultaneously punching selected information into an 8-channel paper tape. The computing unit accepts data from the writing machine; adds, subtracts, and/or multiplies in accordance with instructions wired into the program panel; and transmits results back to the writing machine. This paper outlines the leveling computation problem, describes the functioning of the equipment, and discusses the results. (Author)

PB-167 861 Field 8A, 8J
CFSTI Prices: HC$3.00 MF$0.75

Texas A and M Univ., College Station. Dept. of Oceanography and Meteorology.
PRODUCTIVITY STUDIES ALONG THE ARGENTINE COAST, IN THE DRAKE PASSAGE AND IN THE WEDDELL SEA. V.
Annual rept. for 1 Nov 63-30 Oct 64,
by Sayed Z. El-Sayed. 31 Mar 65, 53p Ref-65-9A
Grant NSF GA112, Proj. 366
Unclassified report

Descriptors: (*Marine biology, Atlantic Ocean), (*Oceanology, Atlantic Ocean), (*Plankton, Atlantic Ocean), Ecology, Physical properties, Chemical properties, Oceanographic data.

The main objectives of these cruises were to study primary production and standing crop of phytoplankton off the Argentine Coast, in the Drake Passage and the Weddell Sea, and to correlate their distribution and abundance with the concentration of the nutrient salts in the areas investigated. Physical, chemical and biological data obtained during the cruises are presented.

PB-167 874 Field 8G, 8J
CFSTI Prices: HC$3.00 MF$0.75

Hydraulic Engineering Lab., Univ. of California, Berkeley.
A CRITICAL APPRAISAL OF THE TECHNIQUE OF USING NATURALLY OCCURRING RADIOACTIVE MINERALS AS LITTORAL TRACERS.
Technical rept.,
by Kenneth H. Huston. 10 Aug 63, 83p
Rept. no. HEL-4-1 Unclassified report
Grant NSF G18123

Descriptors: (*Marine geology, Tracer studies), (*Tracer studies, Sedimentation), (*Sedimentation, Transport properties), Beaches, Seacoast, Ocean currents, Labeled substances, Sand, Gamma-ray spectroscopy, Minerals, Soil mechanics.

Naturally occurring radioactive minerals were used to gauge the direction of movement of littoral sediments. Certain discrepancies and deficiencies in the techniques used do exist, however, which apparently detract from the general applicability of this idea. Among the significant items which must be considered are: the compatibility of samplings; the consequences of erosion and deposition on beaches; the reliability of sampling beach sediments as compared with those from offshore; the relationship of radioactive mineral anomalies to source rocks; the correspondence of hydrologic data; the necessity for heavy-mineral separations; and the adequacy of gamma-ray spectometric determinations. The idea of using naturally radioactive minerals as littoral tracers is attractive and does have promise as a useful tool in sediment-transport studies, provided that subsequent efforts are able to provide critical support for many of the assumptions that have been made. (Author)

PB-167 884 Field 8M
CFSTI Prices: HC$1.00 MF$0.50

Illinois Inst. of Tech., Chicago.
BEHAVIOR OF SHOCK WAVES IN SAND,
by E. T. Selig and E. Vey. May 63, 20p
Grant NSF G23495
Unclassified report

Prepared for Asian Regional Conference (2nd) Tokyo, May 1963.

Descriptors: (*Shock waves, Sand), (*Sand, Shock waves), (*Soil mechanics, Sand), Propagation, Mechanical waves, Soils, Stresses, Loading(Mechanics), Shock tubes.

Experiments were conducted to show the behavior of air induced shock waves in a hydrostatically confined column of sand. The stress-time history was measured at various cross-sections along the column using embedded gages developed for this purposed. The results show that: (1) the shape of the wave changes as it propagates through the soil, (2) the peak stress and average rate of stress rise attenuate very rapidly along the column, and (3) a wave of significant magnitude reflects from the fixed end of the column, superposing upon the incident stress wave.

PB-167 891 Field 8B, 8E
CFSTI Prices: HC$2.00 MF$0.50

Illinois Univ., Urbana.
THEORETICAL DETERMINATION OF THE MAXIMUM BRIDGING DISTANCE IN AEROTRIANGULATION PROJECTS,
by H. M. Karara. 1964, 37p Unclassified report
Grant NSF G19749E
Prepared for presentation at the Congress of the International Society of Photogrammetry (10th), Lisbon, Portugal, Sep 1964 (Commission III).

Descriptors: (*Photogrammetry, Position finding), (*Position finding, Photogrammetry), Mapping, Aerial photography, Stereoscopic map plotters, Errors, Theory.

To ensure a specified level of accuracy in aerotriangulated control (photogrammetric control) on which the steroplotting of individual stereomodels is based, the bridged distances have to be confined within certain limits. This paper discusses the theoretical determination of the minimum density of ground control as a function of the required accuracy and the photogrammetric system used. The basic idea lies in studying the propagation of errors in each of the steps involved in aerotriangulation and its adjustment. The propagation of the residual errors (in planimetry and in elevation) remaining after the adjustment could thus be deduced. By restricting the bridging distances to certain limits, the residual errors could be confined within the allowable tolerances. Charts and formulae for the determination of the maximum bridging distance as well as the theoretically expected accuracy in aerotriangulated elevations are derived and discussed. The planning and design of aerotriangulation projects could be made considerably easier and safer with the help of the presented charts and/or formulae. Thus, the designer of such projects is virtually free of the necessity of heavily relying on long experience and/or guess work. (Author)

PB-167 899 Field 8G, 8D
CFSTI Prices: HC$1.00 MF$0.50

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
THE VOLCANIC DUST SAMPLING PROGRAM OF THE SMITHSONIAN ASTROPHYSICAL OBSERVING STATIONS,
by Frances W. Wright and Paul W. Hodge. 28 Apr 65, 17p Special rept. no. SAO-SR-172
Unclassified report

Rept. on Research in Space Science.

Descriptors: (*Volcanoes, Dust), (*Dust, Volcanoes), (*Geochemistry, Volcanoes), Meteorites, Extraterrestrial topography, Identification, Geology.

A world-wide investigation of volcanic dust was instigated because of the problem of distinguishing between volcanic and meteoritic particles found in terrestrial sediments. The Smithsonian Astrophysical Observing Stations participated by obtaining volcanic dust samples at active and recently active volcanoes in Hawaii, Central America, and South America. Physical and chemical analyses of these samples provided criteria for identification. (Author)

PB-167 960 Field 8I
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
POSSIBILITY OF APPLYING THE GAMMA-GAMMA METHOD TO THE IN SITU DETERMINATION OF URANIUM-ORE DENSITIES (Les Possibilites d'Application de la Methode Gamma-Gamma a la Determination en Place de la Densite des Minerais d'Uranium),
by Jan Czubek and Jean Guitton. Mar 65, 32p
Rept. no. CEA-R-2720
Unclassified report

Text in French, attached summary in English
Available copy will not permit fully legible reproduction.

Descriptors: (*Uranium, Ores(Metal sources)), (*Ores-(Metal sources), Test methods), Chemical analysis, Density, Well logging, Gamma rays, Correlation techniques, Measurement, Geophysical prospecting.

The principles of the gamma-gamma method are reviewed. It is shown in particular that, under certain conditions, the method makes it possible to obtain a representative measurement of the electronic density. Chemical analyses have been carried out on samples obtained from uranium deposits. The results show that an exact correlation exists between the massive and electronic densities. It is possible to consider the possibility of measuring the density of uranium-containing rocks by the gamma-gamma method. (Author)

PB-167 978 Field 8J
CFSTI Prices: HC$2.00 MF$0.50

Fish and Wildlife Service, Washington, D. C.
SOUTHEASTERN ALASKA SEA SURFACE TEMPERATURES, 1959-63,
by Richard S. Williamson. Apr 65, 42p
Unclassified report

Descriptors: (*Alaska Gulf, Temperature), Surface properties, Meteorological parameters, Seacoast, Measurement.

This report presents daily sea surface temperatures from nine observation points on the inside waters of Southeastern Alaska for the years 1959-63. The area covered is from northern Lynn Canal to Dixon Entrance. (Author)

PB-167 998 Field 8M
CFSTI Prices: HC$8.70 MF$2.75

Princeton Univ., N. J. Soil Physics Lab.
BEACH SAND STABILIZATION RESEARCH.
Final rept. for 15 Nov 47-15 Nov 49,
by Hans F. Winterkorn. 15 Nov 49, 567p
Contract NOy15087 Unclassified report
AD 078 133

Descriptors: (*Beaches, Sand), (*Sand, Stabilization), (*Soils, Stabilization), Amphibious operations, Soil mechanics, Trafficability, Cements, Bonding, Moisture-proofing, Scientific research.

09. Electronics and Electrical Engineering

AD-264 259 Field 9D, 17B
CFSTI Price: HC$2.00

Arizona Univ., Tucson. Applied Research Lab.
PARAMETERS OF A NON-SYNCHRONOUS, RANDOM ACCESS, DISCRETE ADDRESS COMMUNICATIONS SYSTEM.
Final rept.
by Leo R. Spogen, Jr., William H. Reading, III, and Victor R. Latorre. Jan 61, 41p
Contract DA36 039sc80146, Task 45 56 0024
USAEPG SIG-960-88
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Communication theory, Pulse communication systems), (*Pulse communication systems, Communication theory), Multiple operation, Multiplex, Signals, Probability, Statistical functions, Errors.

The parameters governing a non-synchronous communication system which uses discrete address and random access are evaluated for two types of discrete addressing. These types are: (1) time division and (2) time and frequency division. In addition, a brief discussion of a random access system using continuous wave transmission is included. These various methods of addressing are evaluated from the viewpoint of subscriber activity as a function of error rate and the number of subscribers which a particular bandwidth can sustain. For discrete values of error rate, it is shown that the amount of bandwidth necessary increases as a function of subscriber activity. Therefore, it may be noted that for the types of discrete addressing which are under consideration, it will be necessary to use transmitters in the kilo-megacycle range if the number of subscribers is to be large, i.e., on the order of thirty or more. (Author)

AD-281 697 Field 9A, 13H
CFSTI Prices: HC$1.00

H-Q Div., Aerovox Corp., Olean, N. Y.
PRODUCTION ENGINEERING MEASURE FOR ROLLED CERAMIC CAPACITORS.
Quarterly rept. no. 3, 9 Dec 61-9 Mar 62,
by S. H. Thompson. 9 Mar 62, 20p
Contract DA36 039sc85963
Unclassified report

Descriptors: (*Ceramic capacitors, Manufacturing methods), Industrial equipment, Casting, Tapes, Sheets, Performance(Engineering).

The effort for this quarter was devoted to evaluating the operation of production facilities that had been fabricated and installed. The necessary design modifications were effected to augment the basic design concepts so that the facilities could operate on a reliable production basis. Attention was given almost entirely to the tape casting machine. (Author)

AD-284 820 Field 9A
CFSTI Prices: HC$2.00

Microwave Lab., Stanford Univ., Calif.
MULTIMEGAWATT BROADBAND MICROWAVE TUBES.
Quarterly memo no. 3, 1 Mar-31 May 62.
Jul 62, 28p Rept. no. ML-933
Contract AF30 602 2575, Proj. 5573, Task 557303
RADC TDR-62-361
Unclassified report

See also AD-610 066.

Descriptors: (*Microwave equipment, Traveling-wave tubes), (*Traveling-wave tubes, Microwave frequency), Radiofrequency power, Broadband, Waveguides, Microwave amplifiers, Circuits, Space charges, Electron beams, Electron guns, Klystrons, Performance-(Engineering), Test equipment(Electronics).

AD-289 351 Field 9A
CFSTI Price: HC$2.00

Weston Instruments, Inc., Newark, N. J.
A POROUS SUBSTRATE RESISTOR AIMED AT MINIATURIZATION OF METAL-FILM RESISTORS.
Interim development rept. for 1 Jul-30 Sep 62,
by Theodore Matley. 19 Oct 62, 31p
Contract NObsr87542, Proj. SR0080303, Task 9636
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Resistors, Metal films), (*Microminiaturization(Electronics), Resistors), Porosity, Electrodeposition, Vapor plating, Vacuum apparatus, Glass, Glass resistors.

Porous materials were sought in the area of plastics as well as glass and ceramics. Various techniques for film deposition have been tested. Various substrates, meeting necessary temperature and electrical properties, were tested for acceptance of film deposition. Acceptable deposition has been obtained on several samples. These include porous substrate and glass spheres. Film deposition has been accomplished using the normal chemical concentrations. Tests have indicated that the minimum pore size necessary for uniform deposition will be 25 microns. (Author)

AD-298 662 Field 9A
CFSTI Price: HC$6.00

Cornell Univ., Ithaca, N. Y. School of Electrical Engineering.
INVESTIGATION OF NOISE GENERATION IN ELECTRICALLY TUNABLE MICROWAVE OSCILLATORS.
Final rept. (App. A) 15 Sep 60-30 Sep 62,
by G. C. Dalman and P. R. McIsaac. 30 Sep 62, 240p
Research rept. no. EE-548
Contract DA36 039sc87368
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Microwave oscillators, Noise(Radio)), (*Noise(Radio), Microwave oscillators), Backward-wave oscillators, Traveling-wave tubes, Tuning devices, X-band, Signal-to-noise ratio, Electron beams.

The report presents the results of a three-year study of noise in tunable microwave oscillators with special emphasis on the backward-wave oscillator, and includes both experimental and theoretical investigations. The program for this noise study was concentrated in three separate areas of investigation. The first of these is a direct experimental determination of the noise properties of several samples of a number of different types of backward-wave oscillators in the X-band region.

Detailed noise measurements have been performed on these tubes at typical i-f frequencies (i.e., 10 Mc/s to 100 Mc/s), and at frequencies very close to the carrier (e.g., tens of kilocycles per second removed from the carrier). The second area of investigation is a theoretical study of the signal-to-noise ratio in a backward-wave oscillator. The third area of investigation concerns the noise behavior of linear electron beams. (Author)

AD-298 663 Field 9A
CFSTI Price: HC$4.00

Cornell Univ., Ithaca, N. Y. School of Electrical Engineering.
INVESTIGATION OF NOISE GENERATION IN ELECTRICALLY TUNABLE MICROWAVE OSCILLATORS,
Final rept. (Apps. B and C) 15 Sep 60-30 Sep 62,
by G. C. Dalman and P. R. McIsaac. 30 Sep 62, 119p
Research rept. no. EE-549 Unclassified report
Contract DA36 039sc87368
Available copy will not permit fully legible reproduction.

Descriptors: (*Microwave oscillators, Noiseadio)), Performance(Engineering), Tuning devices, Backward-wave oscillators, Traveling-wave tubes, Theory, Electron beams, Space charges, Helixes, Circuits, Field theory.

Studies were directed toward formulation of improved theories of backward-wave oscillators that include the periodic property of slow-wave circuits, and in addition, toward analyzing backward-wave oscillators to obtain operating characteristics. The formulation of the theories, however, was performed so that they could be applied to any microwave tube that has a circuit that is periodic along its longitudinal dimension and that interacts with an electron beam flowing parallel to that dimension.

AD-299 700 Field 9D
CFSTI Price: HC$1.00

RAND Corp., Santa Monica, Calif.
ON SYNCHRONIZATION IN COMMUNICATION THEORY,
by I. S. Reed. Mar 63, 19p Memo no. RM-3561-PR
Contract AF49 638 700 Unclassified report
N63 15254
Available copy will not permit fully legible reproduction.

Descriptors: (*Communication theory, Synchronization-(Electronics)), (*Synchronization(Electronics), Communication theory), Communication systems, Coding, Transducers, Noise(Radio).

Suggestions were made for extending Shannon's original notions of communication theory to include some of the difficulties which arise in the design of actual communications systems. It was suggested that one way to deal with many synchronization problems from the standpoint of coding theory was to extend Shannon's definition of a channel to include the transducers at both ends of the line. Shannon's definition of a discrete transducer without noise is extended to one with noise. A lossless transducer with noise is defined and an example is presented, and it is demonstrated that the capacity of such a device can be calculated. A model for a time-varying channel is presented, and it is suggested that for some types of time-varying channels, comma-free coding would be required to establish word synchronization. (Author)

AD-427 740 Field 9A, 17H
CFSTI Price: HC$2.00

Texas Instruments, Inc., Dallas. Apparatus Div.
SOLID-STATE TECHNIQUES FOR MODULATION AND DEMODULATION OF OPTICAL WAVES,
Quarterly progress rept. no. 1, 1 Jul-30 Sep 63,
by D. D. Eden and K. M. Johnson. 30 Sep 63, 33p
Rept. no. U1-802400-1
Contract DA36 039AMC03250E, Proj. 3A99 21 001
Unclassified report
Continuation of Contract DA36 039sc89221.

Descriptors: (*Light communication systems, Modulators), (*Semiconductor devices, Modulators), (*Modulation, Light), Demodulation, Transistors, Diodes(Semiconductor), Quartz, Signal-to-noise ratio, Solid state physics, Transmission lines, Transistor amplifiers.

A number of new types of modulators were developed and tested to compared with the theoretically expected performance and to compare with KDP in its conventional longitudinal mode of operation. The results obtained are as follows: A hexamethylene-tetramine light modulator was constructed and successfully operated. A 45-degree Z-cut KDP crystal light modulator operating with a field transverse to the light path was constructed and successfully operated to several hundred megacycles. A KDP distributed line modulator employing four sections of KDP was constructed and found to operate to frequencies of several hundred megacycles. Using quartz at piezoelectric resonance (2.8 mc) a modulator was operated with near 100% modulation using less than a volt of driving power. A traveling wave quartz modulator was constructed with a 50-cm length. There was very little light loss and the device gave an order of magnitude more modulation than a single piece of longitudinal KDP under equal driving conditions. Deuterated KDP was grown and is being prepared for testing.

AD-429 440 Field 9A, 12A
CFSTI Price: HC$2.00

Stanford Electronics Labs., Stanford Univ., Calif.
THE n-PORT BRUNE SECTION DETAILED,
by R. W. Newcomb. Dec 63, 33p
Technical rept. no. TR-6554-7; SEL-63-102
Grant NSF GP520
Unclassified report

Descriptors: (*Electrical networks, Synthesis), (*Matrix algebra, Electrical networks), Networks, Coupling circuits, Transformers.

AD-432 352 Field 9A, 12A
CFSTI Price: HC$1.00

Stanford Electronics Labs., Stanford, Univ., Calif.
A LOWER BOUND ON THE MINIMUM NUMBER OF GYRATORS IN A PASSIVE NETWORK,
by Robert W. Newcomb. Feb 64, 17p
Technical rept. no. TR-6554-8; SEL-64-005
Grant NSF GP520 Unclassified report
Descriptors: (*Electrical networks, Synthesis), (*Matrix algebra, Electrical networks), S-matrix, Transformers.

Herein proved is without any doubt/The fact Oono's conjectured about./If a network contains a gyrator/Then the number that's minimum's greater/Than one-half of the rank we've called k,/From the skew part of S its assay. (Author)

AD-442 774 Field 9A
CFSTI Price: HC$3.00

General Electric Co., Syracuse, N. Y. Electronics Lab.
FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.
Rept. no. 4 (final) 1 Jun 62-31 May 63,
by J. M. Blank, A. E. Cahill, K. K. Reinhartz, V. A. Russell, and W. Tantraporn. 31 May 63, 80p
Contract DA36 039sc90756, Proj. 3A99 21 003
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Transistors, Electric fields), (*Electric fields, Transistors), (*Space charges, Transistors), Semiconducting films, Electrical conductance, Metal films, Dielectric films, Gain, Power, Temperature, Silicon compounds, Oxides, Cadmium compounds, Sulfides, Zinc compounds, Thickness, Aging(Materials), Electrodes, Configuration, Electric currents, Sandwich construction, Vacuum apparatus, Vapor plating, Fixed contacts, Molecular beams.

A detailed conduction mechanism for thin-film field effect triodes is presented. New experimental findings which seem to substantiate the trap emptying mechanism are outlined. The results of experiments in varying SiO and CdS thickness in field effect triodes and their effect on device performance are shown. Effects of device aging and electrode configurations on device performance are also discussed. Some theoretical considerations for observation of space charge limited current in CdS films are discussed. The methods of fabrication of SCL devices are presented and a new study of SCL current in films and CdS sandwich structures is discussed. A post-deposition treatment of cadmium sulfide films is outlined and results are presented. Preparation of CdS films at various substrate temperatures and in ultra-high vacuum is discussed. A new molecular beam evaporation source for deposition of CdS is also discussed. The difficulties in evaporation of zinc oxide are discussed and the results of these experiments are presented. (Author)

AD-447 407 Field 9A
CFSTI Prices: HC$1.00

General Telephone and Electronics Labs., Inc., Bayside, N. Y.
STUDY OF THIN FILM COMPOUNDS FORMED FROM SIMULTANEOUSLY EVAPORATED CONSTITUENTS.
Quarterly rept. no. 4, 1 Mar-30 Jun 64,
by A. K. Hagenlocher and A. E. Feuersanger.
31 Jul 64, 16p Rept. no. TR-64-206.4
Contract DA36 039AMC00105E, Proj. 1GO 24401A112
Unclassified report

Continuation of Contract DA36 039SC87302.

Descriptors: (*Dielectric films, Preparation), (*Lead compounds, Titanates), Capacitors, Vapor plating, Titanium, Silicon, Oxides, Oxidation, Dielectric properties, Dioxides, Sputtering, Silicon compounds.

The preparation of lead titanate thin films by simultaneous evaporation of lead and titanium oxides has been continued, with emphasis on complete oxidation of titanium while in the vapor phase, prior to film deposition. Test capacitors with lead titanate dielectric have been prepared with a specific capacitance of 1.8 micro F/2 sq. cm. and a dissipation factor of 3.7 percent. The preparation of lead titanate capacitors on silicon substrates is in progress. (Author)

N65-17332 Field 9E
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A METHOD FOR ARRAYING YAGI-DISK ANTENNAS,
by Fred B. Beck. Mar 65, 23p NASA-TN-D-2683
Unclassified report

Descriptors: (*Yagi antennas, Disks), (*Antenna radiation patterns, Yagi antennas), Antenna configurations.

N65-17968 Field 9A
CFSTI Prices: HC$1.00 MF$0.50

Chicago Univ., Ill.
STRONG FIELD FOCUSING FOR SIGNAL GENERATING IMAGE TUBES,
by Jay Burns. Mar 65, 18p
Grant NsG276 62
NASA TN-D-2698
Unclassified report

Descriptors: (*Signal generators, Image tubes), (*Image tubes, Focusing), Magnetic fields, Image intensifiers(Electronics), Gain.

N65-18204 Field 9B, 22C
CFSTI Prices: HC$5.00 MF$1.00

Lockheed Missiles and Space Co., Sunnyvale, Calif.
PRESTO: PROGRAM FOR RAPID EARTH-TO-SPACE TRAJECTORY OPTIMIZATION,
by Robert E. Willwerth, Jr., Richard C. Rosenbaum, and Wong Chuk. Feb 65, 146p
Contract NAS1 2678
NASA CR-158
Unclassified report

Descriptors: (*Programming(Computers), Ascent trajectories), (*Ascent trajectories, Optimization).

N65-18210 Field 9F, 4A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A STANDARD TELEMETRY PACKAGE FOR NIKE-CAJUN AND NIKE-APACHE SOUNDING ROCKETS,
by Edward E. Bissell. Mar 65, 19p
NASA-TN-D-2667
Unclassified report

Descriptors: (*Telemeter systems, Sounding rockets), (*Sounding rockets, Telemeter systems).

N65-19902 Field 9F, 4B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
AIRBORNE TRANSISTORIZED TELEMETER SYSTEM MODEL SST-1,
by R. J. Stattel and J. E. Powell. Apr 65, 30p
NASA-TN-D-2151
Unclassified report

Descriptors: (*Telemeter systems, Sounding rockets), (*Sounding rockets, Telemeter systems).

N65-22967 Field 9E
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
CONSTANT AMPLITUDE, VARIABLE PHASE FILTERS,
by Lonnie Joe Rogers and David S. Hepler. May 65, 21p NASA-TN-D-2758
Unclassified report

Descriptors: (*Filters(Electromagnetic wave), Phase-(Electronics)), (*Phase(Electronics), Filters(Electromagnetic wave)), Phase modulation.

N65-23831 Field 9A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
GENERATION OF ALTERNATING CURRENT BY A POWER DIODE,
by Arthur W. Goldstein, Willis H. Braun, and James R. Rose. May 65, 17p NASA-TM-X-1099
Unclassified report

Descriptors: (*Alternating current, Generators), (*Diodes, Alternating current), Plasma medium, Oscillators, Circuits.

N65-24377 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
DEVELOPMENT OF A SEALED BRUSHLESS DC MOTOR,
by Philip A. Studer. May 65, 8p NASA-TN-D-2819
Unclassified report

Descriptors: (*Direct current, Electric motors), (*Electric motors, Direct current), Hermetic seals.

OTR-120 Field 9E
CFSTI Price: HC$0.50

National Bureau of Standards, Washington, D. C. Inst. for Applied Technology.
MICROMINIATURE CIRCUIT PACKAGING TECHNIQUES.
Jul 65, 17p Unclassified report

Prepared by Westinghouse Electric Corp., Baltimore, Md.

Descriptors: (*Microminiaturization(Electronics), Packaged circuits), (*Packaging, Microminiaturization-(Electronics)), (*Packaged circuits, Manufacturing methods), Films, Integrated circuits, Design, Semiconductor devices, Bibliographies, Abstracting.

Significant reports covering the period since 1962 were selected for this study, with reference to relevant earlier works. Microminiature circuit packaging techniques may be grouped in three major categories commonly referred to as: (1) conventional or discrete components, (2) thin-film integrated circuits, and (3) monolithic semiconductor integrated circuits. In the first category, microminiaturization is achieved by unique packaging schemes employing discrete components either of the hearing-aid-size parts or specially designed comopents having geometric configurations suitable for automated and low volume circuit packaging. The other two categories include component packaging integral with both the design and the fabrication of the circuit, i.e., an integrated circuit where packaging of components and fabrication of components occur during the same process. Packaging of discrete components has resulted in packing densities of 10 to the 5th power to 10 to the 6th power parts/cu.ft. The thin-film technique has resulted in a packing density of 10 to the 5th power to 10 to the 7th power parts/cu.ft.; the monolithic approach promises a packing density of 10 to the 8th power parts/cu.ft. (Author)

Patent 3,189,550 Field 9A

PROCESS OF MAKING FERRITE MAGNETIC CORE MATERIAL.
Patent assigned to Army,
by Walter W. Malinofsky. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Magnetic cores, Ferrites), (*Ferrites, Magnetic cores), Patents, Magnetic materials, Nickel compounds, Nitrates, Hydrates, Iron compounds, Alcohols, Solutions, Powders, Processing, Heating, Pressure.

The magnetic cores may be used in microwave devices, radiofrequency transformers, in telemetering applications and in computers. The magnetic core material is made by propelling an alcoholic solution of nickel nitrate hydrate and iron nitrate hydrate through a fine nozzle, igniting the solution, collecting the ferrite powder in a water tower, prepelletizing the powder, and simultaneously applying heat and pressure to the powder for about 25 minutes.

Patent 3,189,794 Field 9A

RELAY BINARY CIRCUIT.
Patent assigned to NASA,
by Roy E. Currie, Jr. 15 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Computer logic, Electronic relays), (*Electronic relays, Computer logic), Patents, Counting methods, Capacitors.

The binary circuit can be used as a counter-divider circuit, in ring counters, registers, shift shifters, and the like. The circuit includes an input relay, a double-throw relay, two power storage capacitors and two unidirectional conductors associated with the other components.

Patent 3,189,823 Field 9E

TRANSISTORIZED TRANSMITTER EMPLOYING A TRANSMISSION LINE SECTION.
Patent assigned to Navy,
by James C. Mitchell, Jr. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Radio transmitters, Transistors), (*Transistors, Radio transmitters), (*Transmission lines, Radio transmitters), Tuned circuits, Oscillators, Patents.

The oscillator circuit is of the type employing a transmission line section to form its tuned circuit. The circuit employs transistors. The circuit occupies less space than prior art devices.

Patent 3,189,827 Field 9A

RAPID-SCAN INTERCEPT RECEIVER UTILIZING TRAVELING WAVE TUBES.
Patent assigned to Navy,
by William R. Rambo. 15 Jun 65 Unclassified patent
Available from Commissioner of Patents,
Washington, D. C., 20231, $0.25

Descriptors: (*Radio receivers, Traveling-wave tubes), (*Traveling-wave tubes, Radio receivers), Radio scanning, Antennas, Oscillators, Video amplifiers, High frequency, Amplifiers, Demodulators, Patents.

The receiver includes an antenna, a fixed-tuned local oscillator, a high frequency amplifier, a first detector, a low frequency amplifier, a second detector and a video amplifier.

Patent 3,189,833 Field 9E

VARIABLE TIME CONSTANT PULSE INTEGRATOR.
Patent assigned to AEC,
by George W. Rodgers. 15 Jun 65 Unclassified patent
Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Pulse integrators, Timing circuits), (*Timing circuits, Pulse integrators), Wiring diagrams, Patents.

The circuit is designed to integrate a series of unidirectional pulses in which the integration time can be varied over a wide range. The circuit features a unique combination of capacitor-resistance pulse stretching network with a capacitor-resistance pulse integrating network including an active element, introducing power gain into the circuit.

Patent 3,189,837 Field 9A

PULSE GENERATOR EMPLOYING PLURAL PULSE FORMING NETWORKS PROVIDING OVERLAPPED PULSES TO EFFECT RIPPLE CANCELLATION.
Patent assigned to Army,
by Glenn F. Grotz and Michael J. Coyle. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Pulse generators, Pulse integrators), (*Pulse integrators, Pulse generators), Circuits, Wave analyzers, Patents.

A pulse generating circuit is provided wherein the ripple on the output pulse is reduced a considerable extent, thus resulting in a pulse having a more satisfactory waveform. This is accomplished by discharging two pulse forming networks across a microwave transmitter with the pulse from one of the networks being delayed so that it is out of phase with the pulse from the other network. Each of the pulses has the objectionable ripple, but inasmuch as the ripples are out of phase they will match and cancel one another to result in a much flatter pulse being supplied to the microwave transmitter.

Patent 3,189,839 Field 9B, 9A

HIGH SPEED AMPLIFYING MODULATION-DEMODULATION LOGIC.
Patent assigned to Navy,
by Wilfried O. Eckhardt. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Computer logic, Gates(Circuits)), (*Gates(Circuits), Computer logic), Modulation, Demodulation, High-pass filters, Low-pass filters, Signal generators, Modulators, Demodulators, Circuits, Patents.

The 'AND,' 'OR,' and memory storage circuits are for computers using gigacycle rates. The system includes a pump generator connected to a high pass filter and applied to an amplifying amplitude modulator, a signal generator connected to a low pass filter and to the modulator, a high pass filter, a demodulator, a lowpass filter and the signal load.

Patent 3,189,844 Field 9E, 9A, 17I

SEARCH SWEEP OSCILLATOR COMPRISING ONE OR MORE THREE ELECTRODE TRANSISTORS AND A DOUBLE BASE DIODE.
Patent assigned to Army,
by Merlin H. MacKenzie. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Oscillators, Radar tracking), (*Radar tracking, Circuits), Radar equipment, Electronic scanners, Diodes(Semiconductor), Transistors.

The automatic frequency control circuit is for use in such systems as radar where the local-oscillator frequency is swept over a limited range until it locks on a signal. The circuit utilizes semiconductor devices throughout and the arrangement achieves several improvements over the conventional diode-transitron circuit.

Patent 3,189,861 Field 9A

ROTARY CONTACT.
Patent assigned to AEC,
by John A. Masters and William M. Cooper. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Sliding contacts, Patents), Nylon, Containers, Mercury.

The rotary contact comprises a two-part, non-conductive housing with mating concentric channels formed therein. The channels, in turn, contain mercury or other suitable conducting liquids. The use of nylon as the housing material has been found to be superior to other non-conductors due, in part, to the low coefficient of friction, exhibited when one piece is rotated with respect to another, even though they are pressed tightly together.

Patent 3,189,864 Field 9A, 22B

ELECTRICAL CONNECTOR FOR FLAT CABLES.
Patent assigned to NASA,
by Wilhelm Angele and Hans G. Martineck. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Electric connectors, Spacecraft), Electric cables, Patents.

The electrical connector is used with flat cables which are used in space vehicles. The terminal insert connector has a sturdy construction which is light, simple, easily handled, and has a low current leakage between the electrical contacts.

Patent 3,189,906 Field 9A

SHIPBOARD CONICAL ANTENNA WITH CONDUCTIVE SUPPORT MAST.
Patent assigned to Navy,
by John J. Kulik and Richard F. Schmidt. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Conical antennas, Ship antennas), (*Ship antennas, Conical antennas), Broad band, Supports, Design.

The broadband antenna system is for shipboard use. The unique antenna of the conical variety has a metal shaft core, radiating elements which serve to brace and to support the metal shaft in an upright position on a surface and an apex feedpoint whereby a smooth impedance match and a tolerable SWR characteristic is obtained. As an additional feature, the antenna may be designed for ready assembly or quick hoist into position as needed.

Patent 3,189,908 Field 9E

RIDGED WAVEGUIDE SLOT ANTENNA.
Patent assigned to Navy,
by Joseph H. Provencher. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Slot antennas, Waveguides), (*Waveguides, Slot antennas), Waveguide slots, Scanning, Patents.

The antenna has a rectangular waveguide, a loading ridge mounted on and projecting internally from a wall of the waveguide, and at least one radiating slot located adjacent to ther ridge in the same wall that the loading ridge is mounted on.

Patent 3,191,073 Field 9A

THRESHOLD INDICATOR.
Patent assigned to Navy,
by Lawrence K. Mooney. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Signals, Detection), (*Detection, Signals), Trigger circuits, Transistors, Voltage, Patents.

The threshold detection apparatus is for monitoring a direct current input signal of any amplitude between predetermined positive and negative potentials. The apparatus includes two Schmitt trigger circuits, one having a pair of NPN transistors and the other a pair of PNP transistors, two indicators associated with the circuits, power sources, and a voltage divider network.

Patent 3,191,431 Field 9C

PHASE MEASURING DEVICE.
Patent assigned to Navy,
by Fred Schloss. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Phase meters, Specifications), Phase measurement, Measuring devices(Electrical + Electronic), Vibrators(Mechanical), Signal generators, Amplifiers, Voltmeters, Patents.

The apparatus is for determining the phase angle between the force applied to a vibratory system and the resulting vibration of the system. The system includes a signal source, a mechanical vibration generator, an acceleration-responsive gage, a force-responsive gage, a first channel attenuator, a second channel attenuator, first and second channel amplifiers, a voltmeter analyzer and other components.

Patent 3,192,078 Field 9B, 13H

METHOD OF MAKING MAGNETIC CORES HAVING RECTANGULAR HYSTERESIS LOOPS BY BOMBARDMENT WITH ELECTRONS.
Patent assigned to Navy,
by Daniel I. Gordon and Robert S. Sery. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Magnetic cores, Manufacturing methods), (*Manufacturing methods, Magnetic cores), Hysteresis, Iron alloys, Nickel alloys, Molybdenum alloys, Permeability(Magnetic), Electron bombardment, Patents.

The alloy has high magnetic permeability and is used in memory cores. A magnetic material having rectangular hysteresis loops is produced by bombarding the material with electrons while maintaining the temperature below the temperature at which permanent heat treatment effects occur, thus eliminating the use of high temperatures, induced magnetic fields, and expensive nuclear reactors.

Patent 3,192,411 Field 9A

PULSE GENERATOR USING A DUAL FREQUENCY OSCILLATOR TO BOTH DEVELOP AND SWITCH HIGH VOLTAGE.
Patent assigned to Army,
by John Byrne and William A. Stirrat. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Pulse generators, Design), Direct current, Frequency, Oscillators, Voltage, Transistors, Patents.

The pulse generating system has low power consumption. A dual-frequency oscillator using a single transistor is operated from a stable low-voltage D.-C. supply to provide high and low frequency outputs simultaneously.

The high-frequency oscillations are supplied first to voltage step-up transformers next to a rectifying and multiplying circuit and then to a suitable load through a switch which is operated by the low-frequency output of the oscillator. The action of this switch then provides the desired high-voltage pulses to the load at this low-frequency.

PB-167 645 Field 9A, 13H
CFSTI Prices: HC$2.00 MF$0.50

TRW Semiconductors, Inc., Lawndale, Calif.
Research and Development Dept.
TRANSISTOR, VHF, SILICON, POWER (50W-150MC).
Quarterly rept. no. 1, 1 Jul-30 Sep 63,
by M. Preletz, K. Tillung, and E. Moreno. 30 Sep 63,
49p Rept. no. PSI-46-RD-1
Contract DA36 039AMC02355E
AD 436 433

Unclassified report

Descriptors: (*Transistors, Silicon), (*Very high frequency, Transistors), Power, Configuration, Diffusion, Photoengraving, Packaged circuits, Electrical properties, Electric terminals, Manufacturing methods.

The original design proposed on this contract was a stripe structure in a spiral configuration. The assembly and large area problems associated with the spiral configuration were straining present technology to a degree where a new configuration was necessary. The new design consists of 72 separate transistor cells connected in parallel by evaporated contacts. Diffusion and photoresist laboratory areas have been established and a set of processes have been put into operation. These processes are presently being adjusted to insure compatibility with the 50 watt device. Processing of initial samples of the 72 cell Double-Interrupted Emitter Structure has yielded the required number of units for the first six state-of-the-art devices. The 3/4 in. Disc Package was chosen for this device because of its better high-frequency characteristics and availability. Other problems in emitter diffusion and contact metallizing have been detailed and concentration of effort is in this direction.

PB-167 750 Field 9A
CFSTI Prices: HC$1.00 MF$0.50

Naval Weapons Station, Concord, Calif.
WIDE-BAND DC AMPLIFIER KIN TEL 112A,
PLUG-IN UNIT KIN TEL 112A-A.
Instrument calibration procedure technical manual.
15 Feb 65, 11p
NAVWEPS 17-20AA-34

Unclassified report

Descriptors: (*Current amplifiers, Calibration), (*Calibration, Current amplifiers), Direct current, Broadband, Instruction manuals, Test methods.

The manual describes the calibration procedure for the Kin Tel 112A wideband dc amplifier with a Kin Tel 112A-A plug-in unit and either a Kin Tel 196 cabinet or 190B rack adapter.

PB-167 751 Field 9C, 9A
CFSTI Prices: HC$1.00 MF$0.50

Milmanco Corp., Renton, Wash.
DECADE CAPACITOR MODEL CDRM-3 (CORNELL-DUBILIER).
Instrument calibration procedure technical manual.
15 Feb 65, 10p
Contract N123 62861 51295A
NAVWEPS 17-20AC-15

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Capacitors, Test equipment(Electronics)), Capacitance, Capacitance bridges, Test methods, Instruction manuals.

The manual describes the calibration procedure of the Cornell-Dubilier CDRM-3 decade capacitor.

PB-167 752 Field 9A
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
KELVIN-VARLEY DIVIDERS.
Instrument Calibration procedure technical manual.
1 Feb 65, 19p
NAVWEPS 17-20AE-39

Unclassified report

Descriptors: (*Calibration, Voltage dividers), (*Voltage dividers, Calibration), Electrical equipment, Instruction manuals, Test methods.

The manual describes the calibration procedure for Kelvin-Varley dividers.

PB-167 753 Field 9C, 9A
CFSTI Prices: HC$1.00 MF$0.50

Milmanco Corp., Renton, Wash.
PULSE GENERATOR MODEL 79-B (MEASUREMENTS CORPORATION).
Instrument calibration procedure technical manual.
15 Feb 65, 13p
Contract N123 62861 51295A
NAVWEPS 17-20AG-76

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Pulse generators, Test equipment(Electronics)), Pulse analyzers, Modulation, Synchronization(Electronics), Instruction manuals.

The manual describes the calibration procedure for the Measurements Corporation Model 79-B pulse generator. The test instrument is a pulse generator with the capability of generating pulses of variable width and frequency for use with associated equipment. A pulse-modulated carrier output may be obtained by connecting the self-contained modulator stage to an external radio frequency carrier source. The test instrument may also be synchronized to an external frequency standard.

PB-167 756 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
SIGNAL GENERATOR SG-134/ARM-19, BSG-7, BSG-7RC (BABCOCK RADIO ENG., INC.), 0041000, 0041 (INTERSTATE ELECTRONICS CORP.).
Instrument calibration procedure technical manual.
1 Mar 65, 13p
NAVWEPS 17-20AG-96

Unclassified report

Descriptors: (*Signal generators, Calibration), (*Test equipment(Electronics), Signal generators), Instruction manuals, Test methods, Frequency modulation, Radio receivers, Modulation, Frequency, Tests.

The manual describes the calibration procedure for the Babcock Radio Engineering, Inc., model BSG-7 or BSG-7RC, the Interstate Electronics Corporation model 0041000 or 0041, or the SG-134/ARM-19 Signal Generator, which is designed as a test generator for FM receivers operating in the range of 406 to 420 MHz, using carrier deviations up to ±300 kHz.

PB-167 758 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
METER CALIBRATOR TWINCO MC5400A.
Instrument calibration procedure technical manual.
1 Mar 65, 13p NAVWEPS-17-20AQ-25
Unclassified report

Descriptors: (*Test equipment(Electronics), Power supplies), (*Power supplies, Calibration), Instruction manuals, Test methods, Voltage, Direct current, Alternating current, Sources.

The Twinco MC5400A meter calibrator is a general purpose a-c and d-c voltage and current source at frequencies of 60 and 400 cps. The test instrument is calibrated by measuring the voltage and current output values with an ac-dc transfer standard.

PB-167 760 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
OHMMETER, AN/USM-21, AN/USM-21A.
Instrument calibration procedure technical manual.
15 Feb 65, 8p NAVWEPS-17-20AR-17
Unclassified report

Descriptors: (*Test equipment(Electronics), Ohmmeters), (*Ohmmeters, Calibration), Instruction manuals, Test methods, Resistors, Resistance(Electrical).

The manual describes the calibration procedure for the AN/USM-21 or AN/USM-21A ohmmeter.

PB-167 762 Field 9C, 9A
CFSTI Prices: HC$1.00 MF$0.50

Burroughs Corp., Radnor, Pa. Radnor Div.
CRYSTAL CALIBRATOR TS-810/U.
Instrument calibration procedure technical manual.
15 Dec 64, 11p
Contract N123 62861 35057A
NAVWEPS 17-20AY-13
Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Crystal oscillators, Test equipment(Electronics)), Wave analyzers, Frequency analyzers, Pulse analyzers, Instruction manuals.

The manual contains the information necessary for calibrating the TS-810/U Crystal Calibrator, herein referred to as the Test Instrument. This portable, general-purpose instrument provides sharply-peaked pulse outputs at any one of five frequencies: 100 cycles per second, 1 kilocycle per second, 10 kilocycles per second, 100 kilocycles per second, and 1 megacycle per second. It can be used for sweep calibration of pulse analyzer equipment, for checking sweep linearity of oscilloscopes, for calibration of sweeps, and for superimposing timing markers on an oscilloscope trace. (Author)

PB-167 763 Field 9C, 9A
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
TRANSISTOR TEST SET MODELS GP-4, GS-3 (BAIRD-ATOMIC, INC.).
Instrument calibration procedure technical manual.
1 Feb 65, 10p
Contract N123 62861 35056A Unclassified report
NAVWEPS 17-20AY-16

Descriptors: (*Test equipment(Electronics), Calibration), (*Transistors, Test equipment(Electronics)), Test methods, Voltage, Electric currents, Instruction manuals.

The manual describes the calibration of the Baird-Atomic, Inc. models, GP-4 and GS-3, transistor test sets. The GS-3 is a rack mounted version of the GP-4. The GP-4 transistor test set is used to measure the most commonly used small signal parameters of transistors.

PB-167 764 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
PHASE ANGLE VOLTMETER VM-202BR (NORTH ATLANTIC INDUSTRIES).
Instrument calibration procedure technical manual.
15 Feb 65, 18p NAVWEPS-17-20AZ-12
Unclassified report

Descriptors: (*Test equipment(Electronics), Voltmeters), (*Voltmeters, Calibration), (*Phase meters, Calibration), Instruction manuals, Test methods, Phase shifters.

The Phase Angle Voltmeter is tested for line voltage regulation, accuracy, and frequency response. Regulation is tested by injecting an accurately known voltage, and obtaining a reference indication when the line voltage is 115 volts. The reference indication is again obtained with line voltages of 105 and 125 volts, and the input voltage is recorded. Accuracy is tested by obtaining exact Test Instrument indications, and recording the input voltages. Frequency response is tested on 3 ranges by direct comparison with an accurate EVM. The overload light is tested for illumination by injecting a signal 5 times greater than the RANGE switch setting. The reference sensitivity is tested by measuring the input voltage required to obtain a reference indication with the REF ADJ control adjusted for maximum gain. The phase-angle tests are performed by connecting the outputs of a phase shifter to the Test Instrument and a precision phasemeter. The phase shifter is adjusted to various phase angles as indicated by the Test Instrument, and the applied angle is measured with the precision phasemeter. Regulation is tested by performing a measurement, as previously described, at line voltages of 105 and 125 volts.

PB-167 766 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons Representative, Pomona, Calif. Metrology Engineering Center.
COAXIAL FREQUENCY METERS 10 MHz TO 11.0 GHz.
Instrument calibration procedure technical manual.
1 Mar 65, 13p Unclassified report
NAVWEPS 17-20GF-10

Descriptors: (*Test equipment(Electronics), Frequency meters), (*Frequency meters, Calibration), Inspection manuals, Test methods, Power meters, Signal generator, Ultrahigh frequency.

The manual describes the calibration of coaxial frequency meters which operate within the range of 10 MHz to 11.0 GHz.

PB-167 767 Field 9C, 9A
CFSTI Prices: HC$1.00 MF$0.50

Burroughs Corp., Radnor, Pa. Radnor Div.
TEST OSCILLATOR TS-406/UP.
Instrument calibration procedure technical manual.
15 Dec 64, 11p
Contract N123 62861 35057A
NAVWEPS 17-20GG-19
Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Oscillators, Test equipment(Electronics)), Frequency analyzers, Instruction manuals.

The manual contains the information necessary for calibrating the TS-406/UP Test Oscillator. This portable instrument is used to provide a low-power test signal in the frequency range from 1000 to 3500 megacycles. The test instrument is designed for the testing of radio receiving equipment in the field.

PB-167 779 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
AZ-13 VOLTMETER PHASE-SENSITIVE MODEL 240 (DYTRONICS COMPANY, INC.).
Instrument Calibration Procedure Technical Manual.
15 Feb 65, 15p NAVWEPS-17-20AZ-13
Unclassified report

Descriptors: (*Test equipment(Electronics), Voltmeters), (*Voltmeters, Calibration), (*Phase meters, Calibration), Instruction manuals, Test methods, Phase detectors.

The Dytronics model 240 phase-sensitive voltmeter is a sensitive fixed-frequency voltmeter (normally 400 cps), which functions either as a voltmeter or as a phase meter. The manual contains procedures for the calibration of the test instrument.

PB-167 789 Field 9A
CFSTI Prices: HC$2.00 MF$0.50

Bell Telephone Labs., Inc., Murray Hill, N. J.
ENGINEERING SERVICES ON TRANSISTORS.
Rept. no. 9 (Interim and Final) 1 Apr-31 Jul 62,
by R. E. Davis, J. H. Forster, A. G. Foyt, K. E. Martersteck, and J. T. Nelson. 1 Nov 62, 50p
Contract DA36 039sc89201, Proj. 3A99 21 001
AD 294 027
Unclassified report

Continuation of Contract DA36 039sc88931. Available copy will not permit fully legible reproduction.

Descriptors: (*Transistors, Microwave amplifiers), (*Microwave amplifiers, Transistors), (*Semiconductor devices, Manufacturing methods), S band, L band, Radiofrequency power, Silicon, Germanium, Inductance, Measurement, Capacitance bridges, Tuned amplifiers, Silicon compounds, Dioxides, Monoxides, Vapor plating, Manufacturing methods, Mathematical analysis, Resistors, Microminiaturization(Electronics).

A new header with pin-to-pin capacities and lead inductances that are two to three times smaller than for the previous coaxial header is discussed. A measure for evaluating the gain of potentially unstable devices in tuned amplifiers is discussed. Work was carried out in the development of the 1-watt, 1000-mc transistor. Electrical measurement of these devices indicated the theoretical power gain for the device structure was not obtained. The theoretical gain was obtained on units made previously with similar processing techniques. An equivalent circuit for the new power coaxial header and structure modifications to facilitate assembly are described. The input inductance of the header is reduced by a factor of 6 from the original coaxial header. Preliminary design analysis of a 2-watt, 2-Gc transistor is presented. Two designs are proposed. (Author)

PB-167 811 Field 9C, 1D
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
AUTOMATIC FLIGHT CONTROL ANALYZER AN/ASM-103, PART NO. 421830-01-01, PART NO. 421830-01-02, PART NO. Y63-315880-631.
Instrument Calibration Procedure Manual.
1 Feb 65, 37p NAVWEPS-17-20QT-03 superseded
Unclassified report

This publication supersedes NAVWEPS-17-20QT-03 dated 15 Mar 64, PB-181 690.

Descriptors: (*Test equipment(Electronics), Flight control systems), (*Flight control systems, Test sets), (*Test sets, Calibration), Automatic pilots, Instruction manuals, Test methods.

The manual contains calibration instructions that will enable calibration personnel to determine whether the equipment is operating within the prescribed specification limitations. It also includes a list of calibration equipment, corrective action instructions, instructions for the evaluation and recording of data, and difference data sheets.

PB-167 812 Field 9C, 1D
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
ELECTRONIC CONTROL AMPLIFIER TEST SET AN/ASM-104, PART NO. 420681-01-01.
Instrument Calibration Procedure Manual.
Feb 65, 26p NAVWEPS 17-20QT-04 superseded
Unclassified report

This publication supersedes NAVWEPS-17-20QT-04 dated 15 Mar 64, PB-181 691.

Descriptors: (*Test equipment(Electronics), Calibration), (*Automatic pilots, Amplifiers), (*Amplifiers, Test sets), Target drones, Flight control systems, Instruction manuals, Test methods.

The manual contains calibration instructions that will enable calibration personnel to determine whether the equipment is operating within the prescribed specification limitations. It also includes a list of calibration equipment, corrective action instructions, and instructions for the evaluation and recording of data.

PB-167 816 Field 9A, 12A
CFSTI Prices: HC$2.00 MF$0.50

Army Signal Engineering Labs., Fort Monmouth, N. J.
REPORT ON THE DETERMINATION OF EXACTNESS OF FIT OF WESTERN ELECTRIC TYPE 14B THERMISTOR TO THE EQUATION LOG R=A + B/(T+THETA) AND LOG R=A + B/(T+THETA) + CT,
by Layton E. Clark, Jr. 26 Feb 58, 28p
Technical memo. no. M-1951
Task 3 99 04 111
AD 156 261
Unclassified report

Descriptors: (*Thermistors, Equations), Calibration, Corrections, Semiconductors.

The closeness of fit of the two formulas over the -65 to +50 C temperature range was tested against the calibration of forty-seven Western Electric Type 14B thermistors, comprising samples from four production lots. Both formulas describe semiconductors of the Western Electric Type 14B within an accuracy of ±0.1 C, except below -55 C where a correction to the formula must be applied. The four-constant equation describes the 14B thermistor with inaccuracies not greater than ±0.04 C with no correction to the formula at temperatures above -55 C, and within ±0.04 C below -55 C if corrections are made to the formula. (Author)

PB-167 830 Field 9B, 12B
CFSTI Prices: HC$3.00 MF$0.75

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
OPTIMUM QUANTIZATION,
by James D. Bruce. 1 Mar 65, 69p
Technical rept. RLE-TR-429
Contract DA36 039AMC03200E; Grant NSF GP2495
AD 461 646 Unclassified report

Descriptors: (*Analog-to-digital converters, Optimization), Fillers(Electromagnetic wave), Errors, Dynamic programming, Numerical methods and procedures, Digital computers.

The exact expression for the quantization error as a function of the parameters defining the quantizer, the error-weighting function, and the amplitude probability density of the quantizer-input signal is presented. An algorithm is developed that permits us to determine the specific values of the quantizer parameters that define the optimum quantizer. This algorithm is then extended so that optimum quantizers can be determined for the case in which the quantizer-input signal is a message signal contaminated by noise. In each of these cases the algorithm is based on a modified form of dynamic programming and is valid for both convex and nonconvex error-weighting functions. Examples of optimum quantizers designed with the first of these two algorithms for a representative speech sample are presented. The performance of these optimum quantizers is compared with that of the uniform quantizers. (Author)

PB-167 837 Field 9B, 5H
CFSTI Prices: HC$6.00 MF$1.50

Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
STUDY OF COMPUTER MANUAL INPUT DEVICES,
by William T. Pollock and Gilbert G. Gildner.
Sep 63, 271p Rept. no. BSC-40138
Contract AF19 628 435, Proj. 9678, Task 967801
ESD TDR-63-545; AD 419 254
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Computers, Human engineering), (*Human engineering, Computer operators), Performance-(Human), Systems engineering, Job analysis, Digital computers, Command + control systems, Data processing systems, Control systems, Performance-(Engineering), Switches, Design, Input-output devices.

A study of computer manual input devices and their associated human engineering characteristics was conducted for the purpose of developing a scheme for relating these devices to operator performance characteristics, computer characteristics and system requirements. Conventional commercially available input devices such as pushbuttons, toggle switches, joysticks, etc. were surveyed. Available literature pertaining to human performance with such devices was reviewed and summarized. The suitability of devices and availability of applicable performance data are related to a generalized operator task family by a set of tables. Results of the study show a wide variety of available devices, inadequate research data establishing performance for various devices and device characteristics, and incomplete specification of operator input tasks in existing systems. Specific recommendations are made for additional research to correct these deficiencies and to guide applied research on developmental input devices such as speech recognizers. Results of an experiment studying the speed and accuracy of subjects' responses as a function of the number of response alternatives and type of response mechanism (input device) are included. (Author)

PB-167 842 Field 9B, 6D, 5B
CFSTI Prices: HC$1.00 MF$0.50

Chicago Univ., Ill. Committee on Mathematical Biology.
A SUGGESTED MODEL FOR INFORMATION REPRESENTATION IN A COMPUTER THAT PERCEIVES, LEARNS, AND REASONS,
by Peter H. Greene. 1959, 14p
Contract Nonr212117, Proj. 0 9 148 Unclassified report
Available copy will not permit fully legible reproduction.

Descriptors: (*Artificial intelligence, Computers), (*Computers, Artificial intelligence), Computer logic, Bionics, Pattern recognition, Compilers, Information retrieval, Data storage systems, Models(Simulations).

This paper investigates how computers might represent enough of the structure of the percepts and concepts they handle so that they may sensibly be said to deal with the meaning of these things, rather than just to sort and recombine mere labels for the operator's percepts and concepts. One of the main requirements is that each element of information contain partial representations of many other elements and schemata for their interconnection. Some of these requirements may be met if it proves feasible to represent information in the form of vectors (such as modes of oscillation of a complicated network or resonator) which may be resolved into components in various coordinate systems. These systems represent various points of view from which the information may be regarded, and some of the information in each system is elicited by a probabilistic mechanism for use by a conventional computer. (Author)

PB-167 889 Field 9B
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley. Machine Translation Proj.
SUPPLEMENT TO 'CONCORDANCES FROM COMPUTERS', MAY 1965,
by Laura Gould. May 65, 9p Rept. no. CFC-S1
Unclassified report

Descriptors: (*Indexes, Computer storage devices), (*Programming(Computers), Indexes), Input-output devices, Magnetic core storage.

PB-167 931 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.

APPARATUS FOR MEASURING THERMO-ELECTRIC POWER AND HIGH TEMPERATURE RESISTIVITY; RESULTS CONCERNING ARMCO IRON (Appareil de Mesure du Pouvoir Thermoelectrique et de la Resistivite a Haute Temperature: Resultats sur le Fer ARMCO),
by Michel Vandevyver, Dominique Borde, and Halim J. Albany. Apr 65, 11p CEA-R-2783
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Measuring devices(Electrical + Electronic), Thermoelectricity), (*Thermoelectricity, Measuring devices(Electrical + electronic)), High temperature research, Power, Resistance(Electrical), Iron, Thermocouples.

Description is given of an apparatus for the simultaneous measurement of thermoelectric power and electric resistivity of thermoelements between 50 C and 1000 C.

PB-167 969 Field 9C
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
TEST SET, RADIO AN/ARM-53.
Instrument Calibration Procedure Technical Manual,
30 Mar 65, 28p NAVWEPS-17-20ARM53-1
Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Radiofrequency generators, Test sets), (*Test sets, Radiofrequency generators), Instruction manuals, Test methods, Noise(Radio).

The manual describes the calibration of the Test Set, Radio, AN/ARM-53, General Dynamics/Electronics part number 666193-100.

PB-167 970 Field 9C
CFSTI Prices: HC$2.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
TEST SET, RADIO AN/ARM-54
Instrument Calibration Procedure Technical Manual.
30 Mar 65, 28p NAVWEPS-17-20ARM54-1
Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Signal generators, Test sets), Radio signals, Instruction manuals, Test methods, Radiofrequency, Radio frequency oscillators.

The procedure included in this manual describes the calibration of Test Set, Radio, AN/ARM-54, General Dynamics/Electronics part number 666193-500. The manual is divided into six sections. Section I presents the introduction and describes the equipment being calibrated. Section II presents the items of test equipment required to accomplish the preliminary operations described in Section III and the actual calibration procedures contained in Section IV. Section V contains instructions on evaluating the data taken and Section VI contains worksheets and sample checklists.

PB-168 029 Field 9A
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
AE-23 VOLTAGE TO FREQUENCY CONVERTER DY-2210 (DYMEC).
Instrument calibration procedure technical manual.
1 Mar 65, 16p
Contract N123 62861 35056A
NAVWEPS 17-20AE-23
Unclassified report

Descriptors: (*Voltage, Frequency converters), (*Frequency converters, Calibration), Inverters, Test methods, Instruction manuals.

The manual describes the calibration procedure for the Dymec 2210 Voltage to Frequency Converter. The Test Instrument converts a direct input voltage to an alternating output voltage, the frequency of which is proportional to the direct input voltage. A full scale input on a given range produces an output frequency of nominally 10,000 cps.

PB-168 030 Field 9E
CFSTI Prices: HC$1.00 MF$0.50

Autonetics, Anaheim, Calif.
AG-98 PULSE GENERATOR MODEL B7-B (RUTHERFORD ELECTRONICS).
Instrument calibration procedure technical manual.
15 Apr 65, 18p
Contract N123 62861 50267A Unclassified report
NAVWEPS 17-20AG-98

Descriptors: (*Pulse generators, Calibration), Instruction manuals, Test methods, Test equipment-(Electronics), Oscilloscope, Transformers.

The manual describes the calibration procedure for the Rutherford Electronics B7-B pulse generator. This instrument is a general-purpose pulse generator. It is capable of supplying a wide range of output levels, pulse wdth, and time delay at repetition rates of 20 Hz to 2MHz.

PB-168 031 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
AG-94 TIME MARK GENERATOR MODEL 181 (TEKTRONIC, INC.).
Instrument calibration procedure technical manual.
1 Mar 65, 12p
Contract N123 62861 35056A
NAVWEPS 17-20AG-94
Unclassified report

Descriptors: (*Test equipment(Electronics), Timing devices), (*Timing devices, Calibration), Timing circuits, Test methods, Instruction manuals, Oscilloscopes.

The manual describes the calibration procedure for the Tektronix, Inc. 181 Time Mark Generator. The Test Instrument provides accurate time markers, which can be displayed on an oscilloscope for the purpose of sweep calibration or for comparison time measurements.

UCRL-7652-T Field 9B, 12A
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
ON COMPLETE SETS OF LOGIC PRIMITIVES,
by Herschel H. Loomis, Jr. and Robert H. Wyman, Jr.
18 Dec 63, 16p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Computer logic, Special functions), (*Algebras, Computer logic).

10. Energy Conversion (Non-propulsive)

AD-413 018 Field 10C, 7D
CFSTI Prices: HC$4.00

Monsanto Research Corp., Everett, Mass. Boston Labs.
RESEARCH ON ORGANIC DEPOLARIZERS.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 63,
by Bernard A. Gruber and Elizabeth A. McElhill.
31 Mar 63, 129p Rept. no. MRB4006Q7
Contract DA36 039SC87336, Proj. 3A99 09 002
See also AD-403 129. Unclassified report

Descriptors: (*Primary cells, Additives), (*Nitrobenzenes, Primary cells), Electrochemistry, Electrolytic cells, Polarization, Inhibition, Aromatic compounds, Reduction(Chemistry), Electrolytes, Magnesium compounds, Ammonium compounds, Benzoates, Acetates, Peroxides, Bromides, Styrene plastics.

Cathode measurements were made with a modified Kordesch-Marko bridge to determine the ohmic contribution to the total polarization. Cell resistance increases continuously during reduction of nitroaromatic compounds. The major cause of this appears to be a change in electrolyte composition and concentration during operation. The use of electrolytes containing magnesium ions caused the cell resistance to rise much more rapidly than when ammonium cations were present. Initial discharge potential was correlated with Hammett constants. Of the new depolarizers tested, t-butylperbenzoate and t-butylperacetate reduced with high efficiency and polarized less than peroxides previously tested. Polymeric perbromides reduced with high efficiency. Nitrated polystyrene did not reduce. (Author)

AD-416 132 Field 10A, 20L, 11F, 7D
CFSTI Price: HC$4.00

Massachusetts Inst. of Tech., Cambridge. School of Engineering.
RESEARCH ON MATERIALS, PROCESSES, AND DEVICES RELATED TO ENERGY CONVERSION.
Final technical summary rept.
31 May 63, 135p Scientific rept. no. SR-8
Contract Nonr184178, Proj. NR099 360, ARPA Order no. 214-62
N63 23455 Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Energy conversion, Materials), (*Materials, Energy conversion), Superconductors, Solid solutions, Wire, Electrochemistry, Fuel cells, Thermionic emission, Metals, Solid state physics, Semiconductor devices, Semiconductors, Radiation damage, Photoconductivity, Phase studies, High-temperature research.

Contents:
Superconducting materials and systems
Electrochemical energy conversion research
High temperature metallurgy research on thermoelectric and thermionic materials
Solid state energy converters
Development of thermionic emitter materials.

AD-421 013 Field 10C, 7D
CFSTI Price: HC$3.00

Monsanto Research Corp., Everett, Mass.
RESEARCH ON ORGANIC DEPOLARIZERS.
Quarterly progress rept. no. 8, 1 Apr-30 Jun 63, by Bernard A. Gruber and Elizabeth A. McElhill.
30 Jun 63, 100p MRB4006Q8
Contract DA36 039sc87336, Proj. 3A99 09 002
Unclassified report

See also AD-413 018.

Descriptors: (*Primary cells, Additives), (*Nitrobenzenes, Primary cells), Electrochemistry, Electrolytic cells, Cathodes(Electrolytic cell), Polarization, Inhibition, Carbon black, Electrolytes, pH, Resistance(Electrical), Solubility, Catalysts, Nickel, Copper, Lead.

Various physical characteristics of the m-DNB-Shawinigan acetylene black cathode were measured quantitatively. Factorially designed experiments were used to measure water retention by the cathodes in various electrolytes. pH and resistivity of electrolytes and solubility of m-DNB in electrolytes were also determined. Cathodes with different characteristics were then discharged and the degree of ohmic polarization was measured. Low pH minimized ohmic polarization as expected. The minimum requirements of water retention by the cathode, solubility of m-DNB in electrolyte, and resistivity of electrolyte have not been established yet. Electrolytes containing salts of strong bases caused lge kinetic and/or concentration polarization. Initial attempts to catalyze reduction of nitro compounds with Ni, Cu and Pb were unsuccessful. 1,3,5-Trinitrobenzene reduced 0.1 to 0.20v above m-DNB and with a much flatter discharge than picric acid or 2,4,5-trinitrotoluene. (Author)

N65-20998 Field 10B, 22B, 10A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
PARAMETRIC STUDY OF A THERMOELECTROSTATIC GENERATOR FOR SPACE APPLICATIONS,
by Paul M. Margosian. Apr 65, 46p
NASA-TN-D-2763
Unclassified report

Descriptors: (*Generators, Spaceborne), (*Thermoelectricity, Generators).

N65-21225 Field 10B, 22B
CFSTI Prices: HC$4.00 MF$1.00

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
SUNFLOWER TURBOALTERNATOR CSU 1-3A; 4329-HOUR-TEST SUMMARY REPORT.
Apr 65, 128p
Contract NAS5 462
NASA CR-169
Unclassified report

Descriptors: (*Generators, Turbines), (*Power supplies, Satellites(Artificial).

N65-22365 Field 10A, 21E
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ALKALI-METAL TURBINE GEOMETRY AS AFFECTED BY BLADE-SPEED LIMITATIONS,
by Arthur J. Glassman. Apr 65, 16p
NASA-TN-D-2777
Unclassified report

Descriptors: (*Turbines, Alkali metals), (*Alkali metals, Turbines).

Patent 3,189,485 Field 10C

ELECTROCHEMICAL POWER PRODUCING BATTERY CELL.
Patent assigned to Navy,
by Richard E. Panzer. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Batteries + components, Electrochemistry), (*Electrodes, Uranium), (*Uranium, Electrodes), Electrolytic cells, Cathodes(Electrolytic cells), Uranium compounds, Oxides, Anodes(Electrolytic cells), Electric power production, Patents.

Uranium metal and uranium oxides are used in electrochemical power supplies to produce voltages and high current densities. The battery has a solid uranium metal anode, a cathode of uranium oxide and an electrolyte pill made in an anolyte section and a catholyte section. The cell is operative at and above the melting point of the electrolyte and below the melting point of the cell electrodes.

PB-167 632 Field 10C, 7D
CFSTI Prices: HC$3.00 MF$0.50

Monsanto Research Corp., Everett, Mass.
RESEARCH ON ORGANIC DEPOLARIZERS.
Quarterly progress rept. no. 9, 1 Jul-30 Sep 63,
by Bernard A. Gruber, David L. Williams, and Elizabeth A. McElhill. 30 Sep 63, 51p
Rept. no. MRB4006Q9
Contract DA36 039SC87336, Proj. 3A99 09 002
AD 430 572
See also AD-421 013. Unclassified report

Descriptors: (*Primary cells, Additives), (*Nitrobenzenes, Primary cells), Electrochemistry, Electrolytic cells, Polarization, Inhibition, Electrical conductance, Ionic current, Cathodes(Electrolytic cells), Carbon, Ammonium compounds, Bromides, Manganese compounds, Dioxides, Catalysts, Cyanides.

A method is described for determining electronic and ionic conductivities in an organic depolarizer battery bobbin. Preliminary results are reported. This method of determining resistance is compared with other methods used to determine ohmic polarizations. The entire cathode system is analyzed in terms of the variables involved, and in terms of an equivalent circuit. A new method of preparing the cathode mix is described that increases the amount of electrolyte absorbed. The method, involving evacuation of air from the solids before addition of electrolyte, was effective in extending the discharge time of a C/DNB/NH4Br cathode. Ferricyanide was found to have a probable catalytic effect on the reduction of DNB. Mn02 cathodes of commercial origin were found to polarize (preferentially discharge) at the anode interface when used as plate cells.

PB-167 644 Field 10A
CFSTI Prices: HC$2.00 MF$0.50

Engelhard Industries, Inc., Newark, N. J. Process Equipment Div.
HYDROGEN GENERATION FOR FUEL CELLS.
Quarterly rept. no. 6, 1 Aug-31 Oct 63,
by E. J. Emerson, L. Kantrowitz, and L. Goodman. 31 Oct 63, 32p
Contract DA36 039SC89077, Task 1G6 22001A053 04
AD 433 276 Unclassified report

Descriptors: (*Gas-generating systems, Portable), (*Fuel cells, Hydrogen), (*Hydrogen, Fuel cells), (*Electric power production, Fuel cells), Fuels, Ammonia, Hydrocarbons, Catalysts, Life expectancy, Test equipment, Design, Jet engine fuels.

Life testing of the ammonia fueled sample hydrogen generator device, PT-7, was continued. A total of 39 cycles with an accumulated operating time of about 490 hours was accomplished before a weld failure occurred. Testing was subsequently resumed on prototype hydrogen generator, PT-6. To-date, the test generator has been operated 60 cycles with a total accumulative operating time of about 710 hours. There is no indication of any harmful effects due to the cyclic operation, and the reactor performance continues to meet the design capacity specifications. Additional life testing of BTX-Udex raffinate as a fuel using proprietary catalysts indicates continued successful steam reforming approaching equilibrium using a 3.0 mol of water per carbon atom ratio.

PB-167 769 Field 10B
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
REGULATED POWER SUPPLY 712B (HEWLETT-PACKARD).
Instrument calibration procedure technical manual.
1 Mar 65, 11p NAVWEPS-17-20AH-14
Unclassified report

Descriptors: (*Power supplies, Calibration), (*Calibration, Power supplies), Electronic equipment, Voltmeters, Voltage, Ammeters, Resistors, Test methods, Instruction manuals.

The output voltages are calibrated using a direct-current voltmeter. The ripple voltage is measured using an EVM. The line regulation tests are performed by using a direct-current voltmeter to determine any deviation in output voltage versus line voltage change.

PB-168 010 Field 10A, 18L, 18K
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
FLUX AND TEMPERATURE DISTRIBUTION IN THE NUCLEAR THERMIONIC CONVERTERS SIRENE 50 AND SIRENE 100 (Repartition des Flux et des Temperatures dans les Convertisseurs Thermoioniques Nucleaires Sirene 50 et Sirene 100),
by Jean Bliaux and Jean-Michel Jamet. May 65,
57p Rept. no. CEA-R-2782
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Thermionic converters, Nuclear reactors), (*Neutron flux, Thermionic converters), Temperature, France.

A preliminary calculation concerning the perturbed neutron flux in a nuclear thermionic converter is given; the true flux value makes it possible to check the real conversion efficiency. Then, another calculation to determine the temperatures distribution in the fuel pin is presented (assuming several conditions about the neutron flux repartition). A comparative neutronical and thermal study makes it possible to judge the interest of an annular fuel pin converter. (Author)

11. Materials

AD-292 009 Field 11C
CFSTI Price: HC$3.00

Chance Vought Corp., Dallas, Tex. Aeronautics and Missiles Div.
DEVELOPMENT AND EVALUATION OF A HIGH TEMPERATURE PHOTOELASTIC COATING.
Final rept. for Mar 61-Mar 62,
by H. J. Sweet and B. P. Flowers. Oct 62, 77p
Contract AF33 616 7935, Proj. 1367, Task 136710
ASD TDR-62-469
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Plastic coatings, Photoelasticity), (*Photoelasticity, Plastic coatings), High-temperature research, Catalysts, Plastics, Epoxy plastics, Thermal stresses, Tensile properties, Stresses, Bonding, Adhesives, Light transmission, Thermal expansion, Casting.

A number of commercially available plastics and catalysts were investigated to determine which combination showed the most promise as a high temperature photoelastic coating. DER 332, catalyzed with Furane 9425, was chosen, primarily because it exhibited the highest strain-optic coefficient at elevated temperatures of any of the materials investigated. The most serious shortcoming of this combination was a characteristic erratic behavior exhibited by some castings. This tendency appears to have been minimized, however, by means of a specific postcure cycle. Tests were performed to determine the optimum percent catalyst and post-cure cycle, followed by a series of tests to determine the pertinent mechanical and optical properties of the material. The material appears to be limited to a maximum temperature of about 400F with the application techniques used in this program. More refined application techniques would likely extend this limit to about 500F. (Author)

AD-447 730 Field 11I, 7C
CFSTI Prices: HC$2.00

Quantum, Inc., Wallingford, Conn.
HIGH TEMPERATURE POLAMINE RESINS.
Technical progress rept. no. 2, 15 Jun-15 Sep 64,
by Raymond L. Taylor. 15 Sep 64, 28p
Contract NObs90266, Proj. SR007 04 01, Task 1050
Unclassified report

See also AD-441 429.

Descriptors: (*Heat-resistant plastics, Synthesis-(Chemistry)), (*Amino plastics, Synthesis(Chemistry)), Sodium compounds, Aromatic compounds, Amides, Amines, Anhydrides, Cyanates, Chlorine compounds, Polymerization, Copolymerization, Solubility, Organic solvents, Organoboranes, Stability, Molding.

A process for preparing copolymers from N,N'-di-sodium-N,N'-diacetal-p-phenylene diamine and xylylene dichloride was established. Polymers which were meltable at 400 to 800F and soluble in certain organic solvents were prepared. Elemental analyses were made on representative materials indicating the need for improved purification techniques. A polyimine was prepared from p-phenylene diamine and tere-phthalaldehyde which exhibits good thermal stability up to 800F and is insoluble in organic-solvents. Good elemental analyses were obtained. The polyamines prepared from p-phenylene diamine and xylylene dichloride were dissolved and molded into homogeneous articles. Elemental analyses were obtained which indicated the presence of impurities. Thermal stabilities at 600F for several hours were determined. Studies of crosslinking the polyamine with anhydrides and isocyanates were conducted. Pyromellitic dianhydride was the only one of these crosslinking agents that are sufficiently stable for this high temperature application. (Author)

AD-451 038 Field 11F, 21H
CFSTI Prices: HC$1.00

Aerospace Corp., El Segundo, Calif. Lab. Operations.
A COMPARISON OF THE FRACTURE-TOUGHNESS PROPERTIES OF TWO MOTOR CASE STEELS,
by S. F. Frederick. 12 Oct 64, 20p
Rept. no. TDR-469(5250-10)-2
Contract AF04 695 469
SSD TDR-64-238
Unclassified report

Descriptors: (*Rocket cases, Maraging steels), (*Maraging steels, Fracture(Mechanics)), Toughness, Nickel alloys, Cobalt alloys, Molybdenum alloys, Titanium alloys, Processing, Tensile properties, Bainite, Metal plates, Welding, Degradation, Mechanical properties, Heat treatment, Quenching(Cooling).

Available information has been reviewed to compare the fracture-toughness of 18 Ni maraging steels with 9 Ni-4 Co steels as plate. All comparisons are made as a function of static strength. The effects of fabrication variables are also discussed.

AD-455 324 Field 11B, 16C
CFSTI Prices: HC$1.00

Watertown Arsenal Labs., Mass.
CERAMICS FOR NEW WEAPONS,
by Albert P. Levitt. Jun 61, 7p
Monograph series MS-35
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Weapon systems, Ceramic materials), (*Ceramic materials, High-temperature research), Reviews, Thermal properties, Emissivity, Mechanical properties, Cermets, Composite materials, Ceramic coating, Rocket motor nozzles, Nozzle inserts, Control surfaces, Radomes, Nose cones, Graphite, Coatings.

AD-464 626 Field 11H, 13I
CFSTI Price: HC$4.00

Fairchild Hiller Corp., Bay Shore, N. Y. Stratos Div.
DEVELOPMENT OF GAS-ENTRAINED POWDER LUBRICANTS FOR HIGH SPEED-AND HIGH-TEMPERATURE OPERATION OF SPUR GEARS.
Technical rept. for Jun 62-Jan 64,
by S. Wallerstein. May 65, 143p
Contract AF33 657 8625, Proj. 3044, Task 304402
APL TR-65-24
Unclassified report

Descriptors: (*Powders, Lubricants), (*Lubricants, Gears), (*Gears, Lubricants), Graphited materials, Propulsion, Heat-resistant materials, Operation, Steel, Cadmium compounds, Oxides, Alloys.

The feasibility of adapting powder lubricants to the operation of gears during relatively long periods of time under extreme environmental conditions was established. In addition to the lubricant study, parallel investigations were conducted on gear materials and methods of dispensing powder lubricants. A pair of 5 DP spur gears, manufactured from M-50 tool steel, had operated for 98-1/2 hours at a speed of 7400 rpm, load of 1000 pounds per linear inch of tooth face, and temperature cycled from room temperature to 900F. Evaluations of fine-pitch (12/14 DP) superalloy and tool-alloy steel gears were conducted at speeds to 15,500 rpm, temperatures in excess of 1000F, and loads to 1000 pounds per linear inch of tooth face. All high-temperature evaluations performed during this program used a graphite plus cadmium oxide powder mixture as the gear lubricant. An air carrier was used to deliver the powder to the gear set. (Author)

HW-65182RD Field 11A
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
ELECTRICAL SEAL TESTS.
Final rept.,
by H. F. Jansen. 4 Feb 65, 7p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Sealing compounds, Electric wire), (*Electric wire, Adhesives).

N65-16312 Field 11A, 21H
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
EVALUATION OF ADHESIVES FOR SEALING METALLIC AND PLASTIC FILMS FOR USE AT LIQUID-HYDROGEN TEMPERATURES,
by Francis J. DeVos, Harley L. Stutesman, and Paul T. Hacker. Feb 65, 12p NASA-TM-X-1057
Unclassified report

Prepared in cooperation with National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.

Descriptors: (*Seals(Stoppers), Propellant tanks), (*Adhesives, Cryogenics), (*Films, Adhesives), Fuel seals, Plastics, Foils.

N65-16749 Field 11F
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
MECHANICAL PROPERTIES, OXIDATION CHARACTERISTICS, AND WELDABILITY OF TWO UNCOATED AND COATED VANADIUM-BASE ALLOYS,
by Dick M. Royster, Charles R. Manning, Jr., and Cynthia A. Dysleski. Feb 65, 54p NASA-TN-D-2616
Unclassified report

Descriptors: (*Vanadium alloys, Mechanical properties), (*Oxidation, Vanadium alloys), Coatings, Welding.

N65-16886 Field 11F
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
STABILITY OF FOUR TITANIUM-ALLOY AND FOUR STAINLESS-STEEL SHEET MATERIALS AFTER EXPOSURES UP TO 22000 HOURS AT 550 F (561 K),
by George J. Heimerl, Robert M. Baucom, Charles R. Manning, Jr., and David N. Braski. Feb 65, 72p NASA-TN-D-2607
Unclassified report

Descriptors: (*Titanium alloys, Aging(Materials)), (*Stainless steel, Aging(Materials)), Sheets, Supersonic planes.

N65-16893 Field 11H
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INFLUENCE OF ENTRAINED GASES AND A HALOGEN ADDITIVE ON BOUNDARY LUBRICATION OF FOUR OILS AT TEMPERATURES TO 1000 F,
by Donald H. Buckley, Robert L. Johnson, and William A. Brainard. Feb 65, 15p NASA-TN-D-2686
Unclassified report

Descriptors: (*Lubricant additives, Halogens), (*Heat-resistant materials, Lubricants).

N65-17120 Field 11C, 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
IMPROVED CERAMIC-BONDED CALCIUM FLUORIDE COATINGS FOR LUBRICATING NICKEL-BASE ALLOYS IN AIR AT TEMPERATURES FROM 500 TO 1700 F,
by Harold E. Sliney. Feb 65, 15p
NASA-TN-D-2688
Unclassified report

Descriptors: (*Coatings, Fluorides), (*Nickel alloys, Lubrication), (*Calcium compounds, Fluorides), Ceramic materials.

N65-17331 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
RELATION OF LATTICE PARAMETERS TO FRICTION CHARACTERISTICS OF BERYLLIUM, HAFNIUM, ZIRCONIUM, AND OTHER HEXAGONAL METALS IN VACUUM,
by D. H. Buckley and R. L. Johnson. Mar 65, 13p
NASA-TN-D-2670
Unclassified report

Descriptors: (*Crystal lattices, Wear resistance), (*Friction, Metals), (*Metals, Friction), Crystal structure, Beryllium, Hafnium, Zirconium.

N65-17459 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INFLUENCE OF CRYSTAL STRUCTURE ON THE FRICTION AND WEAR OF TITANIUM AND TITANIUM ALLOYS IN VACUUM,
by D. H. Buckley, T. J. Kuczkowski, and R. L. Johnson. Mar 65, 14p NASA-TN-D-2671
Unclassified report

Descriptors: (*Crystal lattices, Wear resistance), (*Titanium alloys, Friction), (*Friction, Titanium), Wear resistance, Vacuum.

N65-18216 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FRICTION AND WEAR OF LOW-MELTING BINARY AND TERNARY GALLIUM ALLOY FILMS IN ARGON AND IN VACUUM,
by Thomas J. Kuczkowski and Donald H. Buckley.
Mar 65, 14p NASA-TN-D-2721
Unclassified report

Descriptors: (*Gallium alloys, Metal films), (*Metal films, Friction), Wear resistance, Vacuum, Controlled atmospheres.

N65-18506 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
THE VAPOR PRESSURE OF MAGNESIUM BETWEEN 223 AND 385 C,
by William P. Gilbreath. Mar 65, 8p
NASA-TN-D-2723 Unclassified report
Descriptors: (*Magnesium, Vapor pressure), (*Vapor pressure, Magnesium).

N65-18607 Field 11B, 20M
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
HEMISPHERICAL SPECTRAL EMITTANCE OF ABLATION CHARS, CARBON, AND ZIRCONIA TO 3700K,
by R. Gale Wilson. Mar 65, 28p NASA-TN-D-2704
Unclassified report

Descriptors: (*Emissivity, Refractory materials), (*Refractory materials, High-temperature research), Atmosphere entry, Surface properties, Carbon, Zirconium compounds, Oxides, Ablation.

N65-19845 Field 11D
CFSTI Prices: HC$2.00 MF$0.50

Astro Research Corp., Santa Barbara, Calif.
COMPRESSIVE STRENGTH OF BORON-METAL COMPOSITES,
by H. Schuerch. Apr 65, 19p
Contract NASw 652
NASA CR-202 Unclassified report
Descriptors: (Fiber metallurgy, Boron), (*Composite materials, Compressive properties), (*Boron, Fiber metallurgy), Metals.

N65-20483 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
SALT-STRESS-CORROSION CRACKING OF RESIDUALLY STRESSED Ti-8Al-1Mo-1V BRAKE-FORMED SHEET AT 550 F (561 K),
by Richard A. Pride and John M. Woodard.
Apr 65, 25p NASA-TM-X-1082
Unclassified report

Descriptors: (*Titanium alloys, Corrosion), (*Corrosion, Titanium alloys), Stresses, Aluminum alloys, Molybdenum alloys, Vanadium alloys.

N65-20878 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
STUDIES OF FATIGUE CRACK GROWTH IN ALLOYS SUITABLE FOR ELEVATED-TEMPERATURE APPLICATIONS,
by C. Michael Hudson. Apr 65, 25p
NASA-TN-D-2743 Unclassified report
Descriptors: (*Heat-resistant metals + alloys, Fracture(Mechanics)), (*Fracture(Mechanics), Heat-resistant metals + alloys).

N65-20985 Field 11F, 1C
CFSTI Prices: HC$3.00 MF$0.75

Battelle Memorial Inst., Columbus, Ohio.
THE FATIGUE BEHAVIOR OF MATERIALS FOR THE SUPERSONIC TRANSPORT,
by M. S. Healy, C. W. Marschall, F. C. Holden, and W. S. Hyler. Apr 65, 90p
Contract NASr100 01
NASA CR-215
Unclassified report

Descriptors: (*Titanium alloys, Fatigue(Mechanics)), (*Stainless steel, Fatigue(Mechanics)), (*Supersonic planes, Heat-resistant metal + alloys).

N65-21161 Field 11F, 18N
CFSTI Prices: HC$4.00 MF$0.75

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
OPERATION OF A FORCED CIRCULATION, CROLOY 9 M, MERCURY LOOP TO STUDY CORROSION PRODUCT SEPARATION TECHNIQUES,
by D. D. Cooper and E. J. Vargo. Apr 65, 96p
Contract NAS3 2538
NASA CR-217 Unclassified report
Descriptors: (*Corrosion-resistant alloys, Nuclear power plants), (*Mercury, Corrosive liquids), Chronium alloys, Steel, Stainless steel.

N65-21641 Field 11D
CFSTI Prices: HC$4.00 MF$0.75

Philco Corp., Newport Beach, Calif.
STRENGTH CHARACTERISTICS OF COMPOSITE MATERIALS,
by Stephen W. Tsai. Apr 65, 95p
Contract NAS7 215
NASA CR-224
Unclassified report

Descriptors: (*Composite materials, Structural properties), Mechanical properties.

N65-21643 Field 11D, 13H
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
STUDIES OF TUNGSTEN COMPOSITES CONTAINING FIBERED OR REACTED ADDITIVES,
by Max Quatinetz, John W. Weeton, and Thomas P. Herbell. Apr 65, 34p NASA-TN-D-2757
Unclassified report

Descriptors: (*Tungsten, Composite materials), (*Fiber metallurgy, Tungsten).

N65-21739 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
THE TERNARY SYSTEM TANTALUM-HAFNIUM-CARBON AT 2050 C,
by Daniel L. Deadmore and Isidor Zaplatynsky.
Apr 65, 13p NASA-TN-D-2768
Unclassified report

Descriptors: (*Tantalum alloys, Phase studies), (*Hafnium alloys, Phase studies), (*Carbon alloys, Phase studies.

N65-22357 Field 11D, 22B
CFSTI Prices: HC$5.00 MF$1.00

General Electric Co., Philadelphia, Pa.
EVALUATIONS OF FILAMENT-REINFORCED COMPOSITES FOR AEROSPACE STRUCTURAL APPLICATIONS,
by Norris F. Dow and B. Walter Rosen. Apr 65, 178p
Contract NASw817
NASA CR-207
Unclassified report

Descriptors: (*Composite materials, Aerospace craft), (*Filaments, Composite materials), (*Fiber metallurgy, Aerospace craft).

N65-23169 Field 11F
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
OBSERVATIONS OF INTERNAL OXIDATION IN SIX NICKEL-BASE ALLOY SYSTEMS,
by James S. Wolf, John W. Weeton, and John C. Freche.
May 65, 60p NASA-TN-D-2813
Unclassified report

Descriptors: (*Nickel alloys, Oxidation), (*Oxidation, Nickel alloys).

ORNL-3777 Field 11F, 13H
CFSTI Prices: HC$2.00 MF$0.50

Oak Ridge National Lab., Tenn.
Evaluation of thorium-base alloys for high-temperature strength,
by J. A. Burke and J. P. Hammond. Apr 65,
Contract W-7405-ENG-26
Unclassified report

Descriptors: (*Thorium alloys, Tensile properties), (*Refractory metal alloys, Thorium).

OTR-119 Field 11D, 13H
CFSTI Price: HC$0.50

National Bureau of Standards, Washington, D. C.
Inst. for Applied Technology.
HONEYCOMB AND SANDWICH MATERIALS,
Jun 65, 15p Unclassified report

Prepared by Syracuse Univ. Research Corp., N. Y.

Descriptors: (*Honeycomb cores, Structural properties), (*Sandwich construction, Structural properties), (*Joining, Sandwich construction), Materials, Sandwich panels, Adhesives, Refractory materials, Foils, Welding, Tantalum, Molybdenum, Brazing, Structures, Tests, Aluminum, Abstracting, Reviews, Bibliographies, Expanded plastics, Plastics, Glass textiles, Ceramic materials, Structural shells, Composite materials.

Significant reports covering the period since 1962 were selected for this study, with reference to relevant earlier works. Recent research in honeycomb sandwich structural materials concerns: (1) the investigation of manufacturing methods and design; (2) testing of panels of various constructions for the effects of elevated temperatures, edgewise compression, thermal response, energy absorption, vibration, and strength as effected by surface waviness and core cell size; (3) testing the joining (welding and brazing) properties of various alloys. (Author)

OTR-121 Field 11I
CFSTI Price: HC$0.50

National Bureau of Standards, Washington, D. C.
Inst. for Applied Technology.
FOAM TECHNOLOGY AND APPLICATION.
Jul 65, 19p Unclassified report

Descriptors: (*Expanded plastics, Scientific research), Manufacturing methods, Vibration isolators, Packing materials, Structural properties, Strength, Construction, Materials, Thermal insulation, Composite materials, Bibliographies, Abstracting, Buoyancy, Physical properties, Material forming.

Significant reports covering the period since 1960 were selected for this study with reference to relevant earlier works. Recent Government-sponsored research and development (R and D) in foam technology has been directed along two lines (1) applications and requirements, and (2) materials research. Significant results have evolved in each of these areas. Materials have been developed that provide good shock and vibration absorption for both high impact and ordinary packaging requirements. Similarly, materials have been found that provide enough structural integrity to be considered as a basic building material. The thermal insulation and buoyancy properties of foam products have also been found important applications. (Author)

OTR-122 Field 11F
CFSTI Price: HC$0.50

National Bureau of Standards, Washington, D. C.
Inst. for Applied Technology.
DISPERSION-HARDENED METALS AND ALLOYS.
Jul 65, 21p Unclassified report

Prepared by Clyde Williams and Co., Columbus, Ohio.

Descriptors: (*Dispersion hardening, Alloys), (*Metals, Dispersion hardening), (*Alloys, Dispersion hardening), Mechanical properties, Aluminum alloys, Nickel alloys, Vanadium alloys, Niobium alloys, Aluminum compounds, Oxides, Titanium compounds, Carbides, Zirconium compounds, Thorium compounds, Magnesium compounds, Powder metallurgy, Abstracting, Bibliographies, Reviews.

Significant reports covering the period from 1960 were selected for this study with reference to earlier works. Recent Government-sponsored research has shown that dispersion hardening as a means of enhancing the strength properties of metals and alloys is a feasible technique. Since its introduction in the early 1950's dispersion hardening has come under close scrutiny, particularily as to the mechanism by which

it operates. Aluminum, nickel, vanadium, and columbium have been utilized extensively as matrices for such dispersants as aluminum oxide, titanium carbide, zirconium carbide, thorium oxide, and magnesium oxide. (Author)

Patent 3,189,441 Field 11F

MAGNESIUM-LITHIUM-THORIUM ALLOYS.
Patent assigned to Army,
by Paul D. Frost and Thomas G. Byrer. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Magnesium alloys, Hardness), Lithium alloys, Thorium alloys, Patents, Heat-resistant metals + alloys, Stability, Airframes, Zirconium alloys, Zinc alloys, Aluminum alloys.

The magnesium base alloy has improved hardness at elevated temperatures. The alloy is useful in the aircraft industry. It consists of 10 to 12 percent, by weight, of lithium, 2 to 4 percent of thorium, and the remainder magnesium.

Patent 3,189,442 Field 11F

MAGNESIUM-LITHIUM-YTTRIUM ALLOYS.
Patent assigned to Army,
by Paul D. Frost and Thomas G. Byrer. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Magnesium alloys, Hardness), Patents, Lithium alloys, Yttrium alloys, Thorium alloys, Aluminum alloys, Stability, Heat-resistant metals + alloys, Airframes, Stresses.

The magnesium-lithium alloy is useful in the aircraft industry where stressed parts are subjected to elevated temperatures. The alloy has good stability at elevated temperatures. It consists of from 10 to 12 percent, by weight, of lithium, 1 to 3 percent yttrium and the balance magnesium.

Patent 3,189,476 Field 11C

METALLIZING PROCESS FOR CERAMICS.
Patent assigned to AEC,
by Robert E. Cowan. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Ceramic materials, Metal coatings), (*Metal coatings, Ceramic materials), Patents, Hermetic seals, Molybdenum, Tungsten, Calcium compounds, Oxides, Aluminum compounds, Powders, Bonding, Heat treatment.

The metallizing process is useful in the preparation of hermetic ceramic-to-metal seals where high strengths are required. Such seals are used in plasma thermocouple insulators, discharge tubes and feed-through insulators for electrical devices. The process provides for the formation of a metallic coating of molybdenum or tungsten metal which is mechanically bonded to a calcium oxide-aluminum oxide reaction layer which in turn is bonded chemically to the alumina ceramic ware.

Patent 3,189,499 Field 11D, 11B

METHOD FOR MAKING POROUS COMPOSITE MATERIALS.
Patent assigned to Air Force,
by Herbert S. Schwartz. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Composite materials, Porous materials), (*Filament wound construction, Composite materials), Patents, Porosity, Fibers, Refractory materials, Winding, Glass textiles, Impregnation, Cellulose plastics, Adhesives, Plastics, Silicon compounds, Dioxides, Ceramic materials, Carbon, Graphite, Aging(Materials), Gases, Decomposition.

The porous composite material may be formed into improved rocket motor nozzles, missile nose cones, aircraft leading edges and the like. The material contains pores and open passages of controlled dimensions in diameter, length, contour and orientation. The composite yarn may be woven into fabrics. The material is particularly useful in applications where heat is encountered.

Patent 3,189,535 Field 11C

MEANS AND METHOD OF DEPOSITING THIN FILMS ON SUBSTRATES.
Patent assigned to NASA,
by Hubert Erpenbach. 15 Jun 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Metal films, Spheres), (*Plating, Metal films), Patents, Ceramic materials, Metal coatings, Sublimation, Electron bombardment, Vaporization, Sputtering, Sapphires, Niobium, Vibration, Rotation, Vapor plating.

Apparatus is provided for coatng ceramic spheres with a metallic coating. The sphere is vibrated and caused to rotate in a random manner so as to effect a random coating. The coating takes place in a bell jar. The coating may be applied by sublimation, electronic bombardment, thermal evaporation, or sputtering. A sapphire sphere may be coated wth niobium for use in cryogenic fields.

Patent 3,189,628 Field 11H, 7C

PHOSPHONATED OILS AND PHOSPHONATED ESTERS.
Patent assigned to Agriculture,
by Hogan B. Knight and Daniel Swern. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Esters, Lubricant additives), (*Lubricant additives, Esters), (*Oils, Lubricant additives), Organic phosphorus compounds, Wear resistance, Lubricants, Polyvinyl chloride, Plasticizers, Phosphonates, Fatty acids, Synthesis(Chemistry), Patents.

The phosphorus-containing esters are useful as lubricant additives for improving the wear and extreme pressure properties of petroleum and of synthetic diester lubricants. Some of the products are useful plasticizers for polyvinyl chloride resins. One of the compounds is from the group consisting of the addition product of a dialkyl phosphonate to an alkyl ester of a polyunsaturated fatty acid and mixtures thereof.

Patent 3,189,669 Field 11I, 13H

PROCESS FOR SHIPPING FLEXIBLE POLYURETHANE FOAM.
Patent assigned to Army,
by Solomon Goldfein. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Expanded plastics, Transportation), (*Transportation, Expanded plastics), (*Packaging, Expanded plastics), Isocyanate plastics, Adhesives, Solvents, Water, Patents.

A flexible polyurethane foam is impregnated with an adhesive containing a water solvent, the solvent is evaporated and the foam is compressed to a fraction of its original volume. The foam is shipped to its destination in the compressed state. The produce is re-expanded by immersing it in the solvent and squeezing out the excess solvent.

Patent 3,190,833 Field 11H

OXIDATION-RESISTANT LUBRICATING COMPOSITION.
Patent assigned to The Lubrizol Corp., Wickliffe, Ohio,
by Alan Rhodes. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Antioxidants), (*Antioxidants, Lubricant additives), Oils, Organic phosphorus compounds, Organic sulfur compounds, Thiols, Organic oxygen compounds, Zinc compounds, Salts, Alkenes, Oxides, Patents.

An oxidation inhibiting agent for mineral and synthetic diester lubricating oils is formed by mixing an oil soluble metal phosphorothionate with an alkylene or aryl-alkylene epoxide. A phosphorothionic acid having alkyl or alkylphenyl radicals containing up to 30 carbon atoms is combined with zinc, calcium, barium or similar metals. Zinc dioctylphosphorothionate and propylene oxide in amounts ranging from 0.25 to 0.75 moles of epoxide per mole of thionate constitute from 0.01 to 3.5 weight percent of the lubricating composition. Depending upon the amount of additive, the product is employed in marine diesel, automobile, and small two-cycle engines and power trains as a crankcase or gear oil.

Patent 3,190,834 Field 11H

LUBRICANT COMPOSITIONS COMPRISING CHLORINATED QUINONES.
Patent assigned to Texaco, Inc., New York,
by Kenneth H. Gee. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Quinones), (*Quinones, Lubricant additives), Oils, Chlorine compounds, Sulfonates, Polycyclic compounds, Terpenes, Sulfur compounds, Calcium compounds, Barium compounds, Magnesium compounds, Silver, Lubrication, Patents.

A lubricating composition having high detergency and anti-corrosive properties for high speed diesel engines is the product of an overbased alkaline metal sulfonate and a chlorinated quinone. Calcium or barium salts of mahogany sulfonic acid, or sulfonic acids having a molecular weight in the range of 350 to 500, contain 425 to 475 percent of excess metal, and are combined with substituted benzoquinones having substituents containing up to 30 carbon atoms. From 0.5 to 5 percent of sulfonate and 0.01 to 2 percent by weight of final composition of chloroquinone are utilized in the lubricating oil. The composition has good silver lubricating properties, and is suitable in large, high speed diesels operating under adverse conditions.

Patent 3,190,835 Field 11H, 21D

METAL DEACTIVATORS.
Patent assigned to Shell Oil Co., New York,
by Wilhelm C.Brezesinska Smithuysen,
Daniel van Velzen, Jacob C. Caron, and Wim de Bruine.
22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Fuel additives, Antioxidants), (*Lubricant additives, Antioxidants), (*Antioxidants, Indoles), (*Indoles, Antioxidants), Hydrocarbons, Oils, Gasoline, Kerosene, Catalysts, Complex compounds, N-heterocyclic compounds, Pyridines, Thiazoles, Pyrroles, Patents.

Di-substituted isoindoline additives are capable of complexing various polyvalent metals which act as oxidative catalysts even when these metals are in hydrocarbon oils containing alkali. When di-substituted isoindoline compounds are added to hydrocarbon oils such as gasoline, kerosene and transformer oils they improve the oxidation stability and storage life of the oils. From 0.1 to 150 p.p.m. by weight of the di-substituted isoindoline compounds are included in the hydrocarbon oil.

Patent 3,192,157 Field 11H

STABILIZED GREASE COMPOSITION.
Patent assigned to Dow Corning Corp., Midland, Mich.
by William G. Gowdy. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Greases, Stabilization), (*Lubricant additives, Siloxanes), (*Sioloxanes, Lubricant additives), Fluorine compounds, Silicon compounds, Dioxides, Patents.

A stable fluorosilicone grease that retains its grease-like character when subjected to heavy working is useful where it will be contacted by the liquid fuels used for rockets. The grease has incorporated into it 100 parts by weight of a polysiloxane fluid which has a viscosity of from 2,000 to 100,000 cs. at 25C. The grease may also contain from 4 to 8 parts by weight of fume silica and from 0.5 to 5.0 weight percent of a hydroxylated siloxane.

Patent 3,192,158 Field 11H

LUBRICATING COMPOSITIONS CONTAINING A DETERGENT COPOLYMER AND AN ALKALINE EARTH PETROLEUM SULFONATE-TRIALKYL AMINE COMPLEX.
Patent assigned to Shell Oil Co., New York,
by Roland F. Bergstrom and Richard C. Nelson.
29 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Polymers), (*Acrylic resins, Lubricant additives), Cleaning compounds, Wear resistance, Vinyl plastics, Pyrroles, Calcium compounds, Barium compounds, Magnesium compounds, Sulfonates, Pyridines, Amines, Thiols, Phosphates, Patents.

Lubricating compositions containing small amounts of an oil-soluble complex of a tertiary alkyl amine containing at least one C6-20 alkyl radical and an oil-soluble basic alkaline earth metal petroleum sulfonate are sludge and wear resistant. The addition of from 0.1 to 5 percent of the complex to lubricating oils containing 0.5 to 10 percent of detergent polymers produces compositions that possess excellent detergent properties. The detergent polymers are either copolymers of long-chain alkyl acrylates and vinyl pyridine or copolymers of long-chain alkylate acrylates and vinyl pyrrolidone.

Patent 3,192,159 Field 11H

WATER-IN-OIL EMULSION LUBRICANT AND HYDRAULIC FLUID.
Patent assigned to Shell Oil Co., New York, by Charles E. Francis. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Hydraulic fluids, Colloids), (*Lubricants, Colloids), (*Colloids, Hydraulic fluids), Fire safety, Corrosion inhibition, Oils, Fatty acid esters, Phenols, Thiols, Thiazoles, Amines, Polycyclic compounds, Zinc compounds, Cadmium compounds, Lead compounds, Sodium compounds, Alcohols, Esters, Patents.

A readily emulsified hydraulic fluid yields a product which is stable, non-toxic, fire-resistant to deterioration, inhibits corrosion and does not cause wear. Oil concentrates are emulsified with 20 to 45 percent water to form a water-in-oil emulsion particularly useful in colliery hydraulic equipment. The oil concentrates are composed of a highly aromatic mineral oil base, from 1 to 4 percent of a monoester of a long chain fatty acid, from 0.5 to 3 percent of a polyalkylenoxy phenoxy alkanol, and from 0.01 to 1.0 percent of an alkali metal dithiocarbonate.

Patent 3,192,160 Field 11H

MINERAL OIL COMPOSITIONS CONTAINING METAL SALTS OF CITRAMIC ACIDS.
Patent assigned to Socony Mobil Oil Co., Inc., by Paul Y. C. Gee and Harry J. Andress, Jr. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Amides), (*Citrates, Amides), Corrosion inhibition, Colloids, Storage, Stability, Magnesium compounds, Barium compounds, Calcium compounds, Zinc compounds, Salts, Mineral oils, Patents.

Metal salts of partial amides of citric acid are useful as additives in mineral lubricating oil compositions. Small amounts of metal salts of citramic acids in lubricating oils act as rust inhibitors, prevent objectionable emulsification and prolong the storage life of the oil. From 1.0 to 200 pounds of the metal salts of citramic acids are used in one thousand barrels of liquid mineral lubricating oils.

Patent 3,192,161 Field 11H

GREASE COMPOSITION.
Patent assigned to Texaco Inc., New York, by Max J. Wisotsky and Norman R. Odell. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Greases, Viscosity), (*Lubricant additives, Complex compounds), (*Complex compounds, Lubricant additives), (*Organic nitrogen compounds, Lubricant additives), Copper compounds, Nickel compounds, Amines, Nitrobenzenes, Phenols, Oils, Siloxanes, Antioxidants, Salicylates, Patents.

Copper and nickel chelates of N-salicylidene-amino-o-hydroxybenzene and the nickel chelates of N-salicylidene-amino-p-nitrobenzene are used as thickening agents for grease compositions. A base lubricating oil having a viscosity in the lubricating oil range is thickened to a grease by using a metal chelate as the thickening agent. The grease composition is from 51 to 90 percent lubricating oil and from 10 to 49 percent metal chelate thickening agent.

Patent 3,192,162 Field 11H

CYCLO-ORGANO COMPOUNDS OF PHOSPHORUS.
Patent assigned to Esso Research and Engineering Co., by Jeffrey H. Bartlett, Samuel B. Lippincott, and Louis A. Mikeska. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Organic phosphorus compounds), (*Organic phosphorus compounds, Lubricant additives), Organic sulfur compounds, Antioxidants, Fatty acid esters, Glycols, Organic nitrogen compounds, Halogen compounds, Oxides, Phenols, Heterocyclic compounds, Fuel additives, Fuel oils, Greases, Wakes, Cutting fluids, Patents.

Esters and ethers of a dithiophosphoric acid compound are used as corrosion and oxidation inhibitors for gasoline, heating and diesel oils, greases, waxes, and cutting and lubricating oils. Phosphoric acids of olefin compounds having nitrogen and halogen groups, or epoxides, or phenols are the basic substances of the additive. Chloromethyl ethers are suitable reactants with the phosphoric acids of glycols and diols. A tridecyl chloromethyl ether derivative of the dithiophosphoric acid of neopentyl glycol, in amounts from 0.01 to 5 percent by weight, is an additive for mineral and synthetic lubricating oils having a viscosity in the range of 40 to 150 SSU at 210 degrees F.

Patent 3,192,163 Field 11H

PROCESS FOR THE STABILIZATION OF PETROLEUM LUBRICANTS.
Patent assigned to Commercial Solvents Corp., New York,
by Edward B. Hodge. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricants, Stabilizaton), (*Lubricant additives, Germicides), (*Organic nitrogen compounds, Lubricant additives), Amines, Nitrates, Bacteria, Inhibition, Cutting fluids, Hydraulic fluids, N-heterocyclic compounds, Patents.

Alkyl nitroamines in amounts to 2 weight percent are used as bacteriostatic agents in cutting and core oils, grinding and iron tinning lubricants, and hydraulic fluids. One composition is 2-nitro-2-methyl-1,3-bis(dibutyl-amino)propane, employed in amounts from 100 to 1000 p.p.m. The compounds exhibit stability and are intended for general bacterial growth inhibition.

Patent 3,192,164 Field 11H

SILICON-CONTAINING LUBRICANT ADDITIVES.
Patent assigned to Standard Oil Co., Chicago, Il.
by Edwin L. De Young and Roger W. Watson.
29 Jun 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Silicon compounds), (*Silicon compounds, Lubricant additives), (*Ketones, Lubricant additives), Silver, Lubrication, Wear resistance, Corrosion inhibition, Sulfides, Patents.

The reaction product of a dalkyl ketone and silicon disulfide is employed as an inhibiting and anti-wear ingredient for lubricating oils containing sulfurized detergents. Each alkyl radical of the ketone has from 1 to 20 carbon atoms, and desirable results are obtained by reacting methyl-n-heptyl ketone and slicon dsulfide in equimolar amounts, under anhydrous conditions, in a temperature range of 80 to 150 degrees C. Complete evolution of hydrogen sulfide is essential. The additive, used in portions from 0.05 to 3 percent by weight of the final product, inhibits the reaction of sulfur on silver and silver-containing bushings and bearings.

Patent 3,192,165 Field 11H

MINERAL OIL COMPOSITION.
Patent assigned to Monsanto Co.,
by Joseph E. Fields and Edward H. Mottus.
29 Jun 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Polymers), (*Polymers, Lubricant additives), (*Hydraulic fluids, Additives), Viscosity, Mixtures, Mineral oils, Acrylic resins, Alcohols, Fuel oils, Fatty acid esters, Ethers, Patents.

A dispersant and pour point depressant for diesel, hydraulic, automatic transmission, furnace and lubricating oils is an interpolymer of vinyloxyethanol and alkyl methacrylates, fumerates, maleates, or acrylates. Mixtures of alkyl methacrylate monomers having from 1 to 4 carbon atoms in the alkyl radical with those of 6 to 20 carbon atoms are combined with from 2 to 20 weight percent of the ethanol composition. From 0.5 to 15 percent of the interpolymer is added to a lubricating composition. Methacrylate monomers and polymers and vinyloxyethanol exhibit good hydrolysis stability, and increase the specific viscosity characteristics of an oil when barium high temperature detergents are used. The compound also improves the viscosity index.

PB-167 817 Field 11B, 7D, 16B, 22C
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Corp., El Segundo, Calif. Lab. Operations.
HIGH TEMPERATURE DEGRADATION OF PHENOLIC-CARBON,
by F. M. Wachi and D. E. Gilmartin. 28 Oct 64,
17p Rept. no. TDR-469(5250-40)-1
Contract AF04 695 469
SSD TDR-64-250; AD 452 551

Unclassified report

Descriptors: (*Heat shields, Ablation), (*Ablation, Gas ionization), (*Phenolic plastics, Degradation), (*Carbon, Degradation), Refractory materials, Oxidation, Nitrogen, Aliphatic compounds, Aromatic compounds, Tar, Free radicals, Atmospheric entry, Wake.

The degradation of phenolic-carbon was investigated at 2100C under a nonoxidizing (N2) and an oxidizing (air) atmosphere at a pressure of 1 atm. A comparison of the gaseous degradation products indicated that phenolic-carbon undergoes oxidative degradation even in the absence of free oxygen at 2100C. When phenolic-carbon is heated under a nitrogen atmosphere, at least 17 per cent of the total mass loss (24 gm per 100 gm of sample) may be ascribed to low molecular weight aliphatic and aromatic hydrocarbons. A large fraction of the remaining 83 per cent of the total mass loss may be attributed to high molecular weight hydrocarbons as evidenced by the tarry substances deposited on the walls of the apparatus; the remainder may be attributed to H2, CO, and H2O. Since these hydrocarbons may be regarded as sources of CH radicals in an oxidizing atmosphere, it may be concluded that sufficient quantity of ablation products is available for the generation of electrons by chemi-ionization in the wake of reentry vehicles whose heat shields are fabricated from phenolic-carbon. (Author)

PB-167 851 Field 11I, 13J
CFSTI Prices: HC$1.00 MF$0.50

Philadelphia Naval Shipyard, Pa. Industrial Test Lab.
A COMPARISON OF THE PHYSICAL PROPERTIES OF POLYURETHANE, POLYSTYRENE AND PHENOLIC FOAMS.
Evaluation rept. (Final),
by M. Glickman. Feb 56, 12p
Rept. nos. 2804A, pt. 1, NS-034-045
AD 86 910

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Expanded plastics, Physical properties), (*Isocynate plastics, Expanded plastics), (*Styrene plastics, Expanded plastics), (*Phenolic plastics, Expanded plastics), Buoyancy, Density, Compressive properties, Aging(Materials), Fracture(Mechanics), Corrosion, Steel, Volume, Heat-resistant plastics, Oils, Degradation.

Three types of plastic foam have been compared for physical properties related to various buoyancy and void space filling applications. Two of the three types, polystyrene and phenolic foams, have been used by the Navy for buoyancy block and void space filling respectively; the third type, polyurethane is being considered for such usage. At a density of 2 lbs./cu. ft. the polyurethane foams fall below the comparison foams in strength, are intermediate in buoyancy retention and fire resistance and approximately equivalent in oil resistance, checking or cracking, corrosion of steel, shrinkage and volume loss on heat aging. (Author)

PB-167 920 Field 11F
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France).
Centre d'Etudes Nucleaires.

ATMOSPHERIC CORROSION OF URANIUM-CARBON ALLOYS (Corrosion Atmospherique des Alliages Uranium-Carbone),
by Pierre Rousset and Andre Accary. May 65, 46p
CEA-R-2732
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Uranium alloys, Carbon alloys), (*Corrosion, Uranium alloys), Air, Humidity, Presentation, Controlled atmospheres, Vacuum, Argon, Corrosion inhibition, Microstructure.

A study was made of the corrosion of uranium-carbon alloys having compositions close to that of the monocarbide. The extent of the observed corrosion effects increases with the water vapour content of the surrounding gas and it is concluded that the atmospheric corrosion of these alloys is due essentially to the humidity of the air, the effect of the oxygen being very slight at room temperature. The optimum conditions for preserving U-C alloys are either a vacuum or a perfectly dry argon atmosphere. It was established that the type of corrosion involved is a corrosion which 'cracks under stress' and is transgranular (it can also be intergranular in the case of sub-stoichiometric alloys. Two hypotheses are proposed for explaining this mechanism, one of which is illustrated by the existence, at the fissure interface, of corrosion products which can play the role of 'corners' in the monocarbide grains. (Author)

PB-167 922 Field 11F
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
STUDY OF GAMMA TO BETA AND GAMMA TO ALPHA TRANSFORMATIONS IN LOW CONTENT URANIUM-MOLYBDENUM ALLOYS (Etude des Transformations Gamma a Beta et Gamma a Alpha dans les Alliages Uranium-Molybdene de Faibles Teneurs),
by Jacqueline Lefranc. May 65, 60p
CEA-R-2763
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Uranium alloys, Molybdenum alloys), (*Phase studies, Uranium alloys), Transformations, Grain structures(Metallurgy), Microstructure, Graphics.

Plots of the TTT graphs corresponding to the gamma to beta and gamma to alpha transformations have been established for two uranium-molybdenum alloys containing 1.1 and 2.1 per cent by weight of molybdenum. These TTT curves have the characteristics of the transformations due to germination and growth, however: - they are flat and almost linear in the gamma to beta zone whereas they have the usual C shape in the gamma to alpha zone; - the incubation periods for the gamma to beta transformation lengthen rapidly with increasing temperature of transformation; those for the gamma to alpha transformation are very short. - the curves for the gamma to alpha transformations exhibit no continuous solution at a temperature of 645 C. The beginning of the transformations in the three zones (beta + gamma), (alpha + gamma), (alpha + gamma') can be represented by a single C-shape. The distance between the curves at the beginning and at the end of the gamma to beta transformation gets progressively smaller as the transformation temperature increases. A delay in the transformation has been observed when the alloys have undergone a homogenizing treatment (950 C) which leads to a large-grain alpha structure. (Author)

PB-167 966 Field 11F
CFSTI Prices: HC$4.00 MF$0.75

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
OF FLOATING-ZONE URANIUM (Sur l'Uranium de Zone Flottante).
Doctoral thesis,
by Georges Ciottes. 12 Jan 65, 114p
Rept. no. CEA-R-2767 Unclassified report
Text in French, attached summary in English
Available copy will not permit fully legible reproduction.

Descriptors: (*Zone melting, Uranium), (*Uranium, Zone melting), Purification, Microstructure, Hardness, Resistance(Electrical), Transition temperature, Recrystallization, Uranium alloys, Gold alloys.

The floating zone method was chosen in order to purify uranium. The various parameters occurring in this purification technique, were studied theoretically and technologically. The speed that proves to be the most efficient is 0.7 cm/h, the direction can only upwards, and the fusion must take place under pressure of 10 to the minus 7th power Torr or so. Besides such problems concerning purification, the study of the floating zone stability led to the definition of a field touching the size and diameter of uranium drops, which, on the one hand coincides wth Heywang's conditions and, on the other hand, is compatible with a fusion in the core of the bar. Such field shows that the floating zone can easily apply to bars whose diameter is included between 5 and 10 mm, and that it cannot work out when the diameter exceeds 21 mm.

PB-168 004 Field 11I
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
PREPARATION OF THIN VYNS FILMS (Preparation de Films Minces de Vyns),
by Rene Blanc, Paul Chedin, and Andree Gizon.
Jun 65, 17p Rept. no. CEA-R-2803 Unclassified report
Text in French, attached summary in English.

Descriptors: (*Vinyl plastics, Films), (*Films, Preparation), Solutions, Ketones.

Fabrication of thin films of VYNS resin (superficial density 3 to 50 micrograms/sq cm) with solutions in cyclohexanone. Study and discussion of some properties. (Author)

12. Mathematical Sciences

AD-279 281 Field 12A
CFSTI Prices: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON THE EXTENSION OF LYAPUNOV'S METHOD TO VARIOUS PROBLEMS OF DIFFERENTIAL SYSTEMS,
by V. Lakshmikantham. 1963, 20p
Technical summary rept. MRC-TSR-277
Contract DA11 022ORD2059 Unclassified report

Descriptors: (*Differential equations, Numerical methods and procedures), Functional analysis, Harmonic analysis.

AD-280 295 Field 12A
CFSTI Price: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON THE ASYMPTOTIC BEHAVIOR OF THE SUM OF A 'NON-HARMONIC FOURIER SERIES',
by P. M. Anselone. Mar 62, 15p
Technical summary rept. no. MRC-TSR-291
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Series, Fourier analysis), (*Fourier analysis, Series), Sequences, Functional analysis.

AD-280 828 Field 12A
CFSTI Prices: HC$2.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
SINGULARITIES OF A HARMONIC FUNCTION OF THREE VARIABLES GIVEN BY ITS SERIES DEVELOPMENT,
by Alvin M. White. Apr 62, 30p
Technical summary rept. MRC-TSR-312
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Functions, Complex variables), (*Partial differential equations, Series), Harmonic analysis, Integral transforms, Operators(Mathematics), Polynomials.

AD-280 829 Field 12A
CFSTI Price: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON THE ASYMPTOTIC BEHAVIOUR OF BESSEL FUNCTIONS,
by Fred Brauer. Apr 62, 10p
Technical summary rept. no. MRC-TSR-313
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Bessel functions, Theory), Trigonometry, Recursive functions, Integrals, Power series.

AD-280 830 Field 12A
CFSTI Price: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
DIFFERENTIAL EQUATIONS IN BANACH SPACES AND THE EXTENSION OF LYAPUNOV'S METHOD,
by V. Lakshmikantham. Apr 62, 21p
Technical summary rept. no. MRC-TSR-315
Contract DA11 022ORD2059
N63 14508
Unclassified report

Descriptors: (*Functional analysis, Differential equations), (*Differential equations, Functional analysis), Numerical analysis.

AD-280 831 Field 12A
CFSTI Prices: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
THE EXTENSION PROBLEM FOR POSITIVE-DEFINITE FUNCTIONS,
by Walter Rudin. May 62, 20p Technical summary rept. MRC-TSR-317
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Functions, Complex variables), Polynomials, Trigonometry, Theory.

AD-280 832 Field 12A
CFSTI Price: HC$2.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
THE SECOND SOLUTION OF LAME'S EQUATION,
by F. M. Arscott. Apr 62, 30p
Technical summary rept. no. MRC-TSR-309
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Differential equations, Theory), Polynomials, Integral equations, Functions.

In this paper, all the known results relating to the second (non-periodic) solution of Lame's equation are summarized, and some new results, including two categories of integral representation, are given. (Author)

N65-17964 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

State Univ. of Iowa, Iowa City.
DERIVATION OF MAPPING FUNCTIONS FOR STAR-SHAPED REGIONS,
by Kwan Rim and Roger O. Stafford. Mar 65, 34p
Grant NsG576
NASA CR-192
Unclassified report

Descriptors: (*Conformal mapping, Spikes).

N65-17969 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Montana State College, Bozeman.
NONPARAMETRIC DENSITY ESTIMATION AND CLASSIFICATION,
by C. P. Quesenberry and D. O. Loftsgaarden.
Mar 65, 79p
Grant NsG562
NASA TN-D-2699
Unclassified report

Descriptors: (*Statistical analysis, Probability), (*Density, Classification), Analysis of variance, Sampling.

PB-167 687 Field 12B
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
NOTES ON PARAMETRIC LINEAR PROGRAMMING,
by Alan S. Manne. 15 Dec 53, 11p
Rept. no. P-468
AD 224 256
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Linear programming, Optimization), Matrix algebra.

PB-167 704 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
SUMS OF STATIONARY RANDOM VARIABLES,
by Enders A. Robinson. Feb 59, 6p
Technical summary rept. no. MRC-TSR-79
Contract DA11 022ORD2059
AD 213 464
Unclassified report

Descriptors: (*Stochastic processes, Functional analysis), Theorems, Measure theory, Statistical functions, Combinatorial analysis.

PB-167 712 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
SYNTONICITY OF FUNCTIONS AND THE VARIATION FUNCTIONAL,
by Preston C. Hammer. Jan 59, 12p
Technical summary rept. no. MRC-TSR-66
Contract DA11 022ORD2059 Unclassified report
AD 210 917

Descriptors: (*Functions, Set theory), Real numbers, Functional analysis, Calculus of variations, Combinatorial analysis.

If g and h are real-valued functions of a real variable which are of bounded variation then the subadditivity property V(g + h) < or = V(g) + V(h) holds where V(f) is the total variation of f. It is one purpose of this paper to establish necessary and sufficient conditions that the equality sign hold. It is found that the concept of syntonic function pairs which is introduced here is precisely what is needed. Intuitively, the graphs of syntonic function pairs rise and fall together.
PB-167 8

PB-167 728 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON A UNIFIED THEORY OF BOUNDARY VALUE PROBLEMS FOR ELLIPTIC-PARABOLIC EQUATIONS OF SECOND ORDER,
by Gaetano Fichera. Sep 59, 26p
Technical summary rept. MRC-TSR-110
Contract DA11 022ORD2059 Unclassified report
AD 226 813

Descriptors: (*Boundary value problems, Theory), (*Partial differential equations, Boundary value problems), Operators(Mathematics), Functional analysis, Inequalities.

The present lecture is concerned with the theory of boundary value problems for linear partial differential equations of second order. It consists of a proposal for a unified theory of boundary value problems for a second order linear equations of elliptic-parabolic type, including the classical cases of totally elliptic equations, heat equation, and first order equations. The theory does not claim to be complete at this time.

PB-167 730 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
A GROUP THEORETICAL CHARACTERIZATION OF SOME MANIFOLD STRUCTURES,
by Charles Loewner. 13 Aug 62, 31p
Technical rept. no. TR-2
Grant NSF G14 134
Unclassified report

Descriptors: (*Groups(Mathematics), Complex variables), Matrix algebra, Transformations(Mathematics), Algebraic topology.

PB-167 732 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
ON UNIMODULAR SETS OF VECTORS,
by I. Heller. 19 Jul 62, 26p Technical rept. no. TR-2
Grant NSF G20035
Unclassified report

Descriptors: (*Set theory, Matrix algebra), (*Matrix algebra), (*Matrix algebra, Set theory), Groups-(Mathematics), Transformations(Mathematics).

The definition of the concept of a unimodular set is followed by a discussion of some of its properties and a study of interrelations between classes of maximal unimodular sets. The main result is a theorem on the union of two unimodular sets. The paper constitutes an introductory presentation on the subject. (Author)

PB-167 772 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Dept. of Statistics.
BOUNDS ON THE MAXIMUM SAMPLE SIZE OF A BAYES SEQUENTIAL PROCEDURE,
by S. N. Ray. 25 May 64, 41p
Technical rept. TR-3
Grant NSF GP2220
Unclassified report

Descriptors: (*Sequential analysis, Sampling), (*Sampling, Sequential analysis), Statistical tests.

PB-167 790 Field 12B
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
NOTES ON LINEAR PROGRAMMING: PART XLV, A NETWORK-FLOW FEASIBILITY THEOREM AND COMBINATORIAL APPLICATIONS,
Research memo.,
by D. R. Fulkerson. 21 Apr 58, 34p
Rept. no. RM-2159
AD 156 011
Unclassified report

Available copy will not permit fully legible reproduction,

Descriptors: (*Linear programming, Theorems), (*Combinatorial analysis, Linear programming), Matrix algebra.

Necessary and sufficient conditions are established for the existence of a flow in a network, say a railway network, satisfying precribed bounds on the net flow leaving certain nodes and entering other nodes. These conditions are applied to the study of combinatorial problems concerning matrices of zeros and ones, subgraphs of a directed graph, and systems of distinct representatives. (Author)

PB-167 794 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
TIMELIKE INITIAL VALUE PROBLEMS FOR HYPERBOLIC EQUATIONS: I,
by J. M. Zimmerman. Apr 62, 18p
Rept. no. IMM-NYU-294
Grant NSF G14520

Unclassified report

Descriptors: (*Boundary value problems, Partial differential equations), (*Partial differential equations, Boundary value problems), Integral transforms.

PB-167 795 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
FINITE-DIMENSIONAL PERTURBATION AND A REPRESENTATION OF SCATTERING OPERATOR,
by S. T. Kuroda. Nov 62, 29p
Grant NSF GP2

Unclassified report

Descriptors: (*Perturbation theory, Operators-(Mathematics)), (*Operators(Mathematics), Perturbation theory), Functional analysis, Scattering, Matrix algebra.

PB-167 796 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
CRITERIA FOR STOCHASTIC PROCESSES II: PASSAGE-TIME MOMENTS,
by John Lamperti. 23 Jul 62, 31p
Technical rept. no. TR-16
Grant NSF16319

Unclassified report

Descriptors: (*Stochastic processes, Theorems), Recursive functions, Measure theory.

PB-167 806 Field 12B
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Institute for Mathematical Studies in the Social Sciences.
NON-LINEAR PROGRAMMING WITH RANDOMIZATION,
by Stan Fromovitz. 16 Apr 64, 27p
Technical rept. no. TR-4
Grant NSF G24064

Unclassified report

Descriptors: (*Nonlinear programming, Stochastic processes), (*Stochastic processes, Nonlinear programming), Optimization.

PB-167 849 Field 12B, 15G
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
A CONTINUOUS COLONEL BLOTTO GAME,
by O. Gross and R. Wagner. 17 Jun 50, 16p
Memo no. RM-408
ATI 210 337

Unclassified report

Descriptors: (*Game theory, Strategic warfare), Optimization, Decision theory.

PB-167 852 Field 12B, 15G
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
AN INFINITE-DIMENSIONAL EXTENSION OF A SYMMETRIC BLOTTO GAME,
by Oliver Gross. 8 Nov 51, 9p
Memo. no. RM-718
ATI 210 400

Unclassified report

Available copy will not permit fully legible reproduction.
Rept. on Proj. RAND.

Descriptors: (*Game theory, Optimization), Functional analysis, Probability, Military strategy.

A two-person zero-sum game over a function space and with discontinuous payoff is considered which has an optimal strategy for either player, consisting of randomizing over a certain two-parameter family of functions. (Author)

PB-167 855 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Mathematics Research Center, Univ. of Wisconsin, Madison.
THE ASYMPTOTIC SOLUTIONS OF A LINEAR DIFFERENTIAL EQUATION OF THE SECOND ORDER WITH TWO TURNING POINTS,
by Rudolph E. Langer. 12 Mar 57, 53p
Technical summary rept. no. MRC-TSR-1
Contract DA11 022ORD2059
AD 147 634

Unclassified report

Descriptors: (*Differential equations, Theory), Bessel functions, Real variables, Complex numbers, Special functions(Mathematical).

PB-167 857 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
SEMIGROUPS GENERATED BY CONTRACTING VECTOR FIELDS,
by John V. Ryff. 27 Apr 62, 76p
Technical rept. no. TR-1
Grant NSF G14134

Unclassified report

Descriptors: (*Groups(Mathematics), Matrix algebra), Transformations(Mathematics), Vector analysis.

PB-167 868 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
LIMIT THEOREMS FOR BIRTH AND DEATH PROCESSES,
by William J. Studden. 28 Feb 62, 65p
Technical rept. no. TR-15
Grant NSF G16319

Unclassified report

Descriptors: (*Statistical processes, Theorems), (*Measure theory, Statistical processes), Integral transforms, Recursive functions, Polynomials, Probability.

PB-167 869 Field 12A
CFSTI Prices: HC$6.00 MF$1.50

American Mathematical Society, Providence, R. I.
LECTURE NOTES PREPARED IN CONNECTION WITH THE SUMMER INSTITUTE ON FUNCTIONAL ANALYSIS HELD AT STANFORD UNIVERSITY, AUGUST 1-25, 1961.
1961, 257p
Grant NSF G14572

Unclassified report

Descriptors: (*Functional analysis, Symposia), (*Symposia, Functional analysis), Distribution theory, Partial differential equations, Operators-(Mathematics), Functions, Harmonic analysis.

Contents: On quasianalyticity and general distributions by A. Beurling, The structure of solutions of systems of partial differential equations by Leon Ehrenpreis, Differential operators with non-singular characteristics by L. Hörmander, Pseudo-periodic functions by J. P. Kahane, Some applications of entire functions of exponential type to harmonic analysis by P. Malliavin.

PB-167 870 Field 12B, 5A
CFSTI Prices: HC$5.00 MF$1.25

Stanford Univ., Calif. Graduate School of Business.
CONVEXITY PROPERTIES OF A FAMILY OF STOCHASTIC INVENTORY MODELS.
Technical rept.,
by Robert F. Love. Jun 65, 183p Rept. no. TR-13
Grant NSF GS552 Unclassified report

Descriptors: (*Stochastic processes, Inventory control), (*Inventory control, Stochastic processes), Stock level control, Mathematical models, Costs, Operations research, Nonlinear programming.

The purpose of this study was to mathematically model a set of stochastic production-inventory systems where the criterion of optimality is the minimization of total cost. Each model is provided with an exact computing algorithm which finds optimum policies. The literature contains a large number of transactions reporting inventory models. Unfortunately, most of these are unsuitable for application because of restricting assumptions, approximations to the total cost function which lead to erroneous solutions, or a complete omission of a solution method. All the models presented incorporate the basic assumptions of unit reorder quantities, captive orders, and a first come, first served supply policy for replenishment orders. Costs considered include an inventory carrying cost and an inventory facility cost at each station, and an order backlog cost. The models are developed with linear underlying costs. It is proven that all properties of the models hold when the cost functions are increasing and convex.

PB-167 890 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Mathematical Statistics.
LIMITING DISTRIBUTION OF THE MAXIMUM OF A DIFFUSION PROCESS,
by Simeon M. Berman. 8 Apr 63, 27p
Grant NSF GP316

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Distribution theory, Statistical processes), (*Statistical processes, Distribution theory), Real numbers, Probability, Measure theory, Recursive functions.

PB-167 903 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
GENERALIZED CONVEX INEQUALITIES,
by Samuel Karlin and Albert Novikoff. 21 Aug 62, 48p Technical rept. no. TR-17
Grant NSF G16319

Unclassified report

Descriptors: (*Inequalities, Convex sets), (*Convex sets, Inequalities), (*Functions, Inequalities), Theory.

This paper concerns certain cones of functions phi and their duals. The elements of these cones can be described globally by determinantal inequalities with the aid of specified auxiliary functions psi sub 1, ..., psi sub k or locally, if phi is sufficiently smooth, by differential inequalities. In the latter case smoothness hypotheses are imposed on the specified auxiliary functions in order to define the relevant differential operator. These cones can be regarded as generalizations of the classical cone of convex functions. These cones occur in moment theory, problems of interpolation, differential equations, probability theory and elsewhere.

PB-167 985 Field 12B
CFSTI Prices: HC$1.00 MF$0.50

Rand Corp., Santa Monica, Calif.
INDUCTIVE PROOF OF THE SIMPLEX METHOD.
Revised ed.,
by George B. Dantzig. 9 May 60, 9p
Rept. no. P-1851
AD 224 306

Unclassified report

Revision of manuscript submitted 28 Dec 59.

Descriptors: (*Linear programming, Iterative methods), Mathematical logic, Theorems.

As pointed out in the introduction, instead of the customary proof of the existence of an optimal basis in the simplex method based on perturbation of the constant terms we shall give a new proof based on induction. From a pedagogical point of view it permits an earlier and more elementary proof of the fundamental duality theorem via the simplex method. Specifically we shall show that there exists a finite chain of feasible basis changes, which results in either an optimal feasible solution or in an infinite class of feasible solutions, such that the objective form tends to minus infinity. (Author)

PB-167 995 Field 12B
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
OPTIMAL STRATEGIES IN GAMES OF SURVIVAL,
by Melvin Hausner. 18 Feb 52, 9p
Research memo. RM-777
ATI 210 442

Unclassified report

Descriptors: (*Game theory, Survival), (*Optimization, Game theory), Probability, Strategic warfare.

A simple procedure is given to calculate the optimal strategies and the survival probability for a general class of games of survival. Theorem 1 shows that for games of this particular type, the optimal strategy for both players depends only on the amount of money held by the second player. (Author)

PB-167 996 Field 12B
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
GAMES OF SURVIVAL,
by Melvin Hausner. 12 Feb 52, 11p
Research memo. RM-776
ATI 210 441 Unclassified report

Descriptors: (*Game theory, Survival), Matrix algebra, Optimization, Probability.

A 2x2 zero-sum game is played continually by 2 people, the object being either survival or ruin of the opponent. There is a constant sum of money in the game. It is shown that in general the game has a solution and that these two motives are equivalent. Methods for calculating the solution are given and a particular example is worked out. A singular example is given with a discussion. A game is shown to be singular only if on a single play there is a possibility of a draw (there is a zero entry in the matrix). (Author)

PB-168 022 Field 12B
CFSTI Prices: HC$1.00 MF$0.50

Applied Mathematics and Statistics Labs., Stanford Univ., Calif.
ON LINEAR PROGRAMS EQUIVALENT TO THE TRANSPORTATION PROGRAM,
by I. Heller. 7 Aug 62, 20p Technical rept. no. TR-3
Grant NSF G20035
Unclassified report

Descriptors: (*Linear programming, Transportation), (*Transportation, Linear programming), Matrix algebra, Transformations(Mathematics).

PB-168 023 Field 12A, 20J
CFSTI Prices: HC$4.00 MF$1.00

American Mathematical Society, Providence, R. I.
LECTURE NOTES PREPARED IN CONNECTION WITH THE SUMMER INSTITUTE ON RELATIVITY AND DIFFERENTIAL GEOMETRY HELD AT THE UNIVERSITY OF CALIFORNIA AT SANTA BARBARA, JUNE 18-JULY 16, 1962. Part I.
1962, 137p
Grant NSF G21211 Unclassified report
Available copy will not permit fully legible reproduction.

Descriptors: (*Symposia, Differential geometry), (*Differential geometry, Symposia), (*Relativity theory, Symposia), Topology, Green's function, Algebraic topology.

Contents:
Problems proposed at the 1962 summar institute on relativity and differential geometry
Topological properties of lorentz manifolds, parts I and II by A. Avez
Spinors in general relativity by A. Lichnerowicz
A question on harmonic spinors by Atiyah and Singer report by R. Bott, notes by T. Banchoff
The method of images in geometrostatics by Charles W. Misner
Solutions of the cauchy problem in general relativity by Dieter Brill
ntroductory remarks on modern differential geometry by S. S. Chern, notes by T. Banchoff
Green's functions in riemannian manifolds by B. S. DeWitt
Deformation of structures on manifolds (general theory) by D. C. Spencer
Deformation of structures on manifolds (examples) by Phillip A. Griffiths
Isotropic lorentz spaces by S. Helgason.

PB-168 025 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Wisconsin Univ., Madson. Dept. of Mathematics.
FINAL REPORT. MATHEMATICS RESEARCH PROGRESS REPORT.
Rept. for Nov 59-Jan 63, Oct 61-Jan 63,
by Jacob Korevaar and Wolfgang Wasow. Feb 63, 7p
Grants NSF G10093, NSF G19925 Unclassified report

Descriptors: (*Mathematics, Scientific research), Numerical analysis, Polynomials, Set theory, Functional analysis, Differential equations, Perturbation theory, Partial differential equations, Series.

A report is given of research progress on the following topics: approximation by polynomials, distributions, ordinary differential equations, partial differential equations, partial sum problems, Tauberian theorems.

UCRL-7588 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
POWERS OF POWER SERIES,
by Richard E. Von Holdt. 5 Nov 63, 6p
Contract W-7405-ENG-48 Unclassified report

Descriptors: (*Power series, Sequences), (*Sequences, Power series).

UCRL-7617-T Field 12A, 4B
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
EXPANSION OF GEOPHYSICAL SCALAR FIELDS IN SURFACE SPHERICAL HARMONICS,
by Hugh W. Ellsaesser. 5 Dec 63, 49p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Special functions(Mathematical), Meteorological parameters), (*Meteorological parameters, Special functions(Mathematical)).

UCRL-7681 Field 12A, 9C
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
A PROGRESSIVE INTERPOLATION SCHEME FOR HAND AND DIGITAL COMPUTER ANALYSIS OF TABULATED DATA,
by Michael D. Mintz, and Duane P. Jordan.
5 Feb 64, 15p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Digital computers, Tables), (*Tables, Numerical analysis).

UCRL-9498 (Rev.) Field 12B
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
LINEAR PROGRAM APPROACH TO LINEAR DIFFERENTIAL PROBLEM,
by Jonathan D. Young. 11 Nov 63, 11p
Contract W-7405-ENG-48 Unclassified report

Descriptors: (*Linear programming, Mathematical models), (*Differential equations, Linear systems).

13. Mechanical, Industrial, Civil, and Marine Engineering

AD-457 080 Field 13J, 13C, 13M
CFSTI Price: HC$6.00

Naval Research Lab., Washington, D. C.
STATUS AND PROJECTIONS OF DEVELOPMENTS IN HULL STRUCTURAL MATERIALS FOR DEEP OCEAN VEHICLES AND FIXED BOTTOM INSTALLATIONS.
Final rept.
ed. by W. S. Pellini. 4 Nov 64, 256p
Rept. no. NRL-6167
Unclassified report

Back-Up rept., Undersea Technology Panel, Proj. SEABED.

Descriptors: (*Submarine hulls, Materials), (*Structures, Underwater), (*Materials, Naval research), Reviews, Steel, Titanium alloys, Aluminum alloys, Glass textiles, Plastics, Glass, Composite materials, Filament wound construction, Epoxy plastics, Concrete, Buoyancy, Pipes, Reinforcing materials, Welding, Seals(Stoppers).

A wide variety of hull structural materials may be expected to compete in the future for applications in both military submarines and deep-diving research vehicles. These include steels, titanium, aluminum, fiber-reinforced plastics, and glass. Additionally, composite construction incorporating different materials may be expected to be competitive. This report comprises a number of separate sections dealing with the state of the art and projections of feasible advances in the related processing and fabrication technologies. Similar dissertations are presented for ancillary materials such as hard sea water piping and buoyancy (syntactic) foams. A unique feature of these sections is represented by the use of 'Frame of Reference Charts' which provide a graphical summary of the broad spectrum of strength level and fabrication techniques that may be utilized for the construction of metal structures. This information is applicable also for the construction of fixed bottom installations-of special interest in this respect is a section concerned with the utilization possibilities of concrete. (Author)

N65-16882 Field 13M
CFSTI Prices: HC$4.00 MF$0.75

North American Aviation, Inc., Columbus, Ohio.
INVESTIGATION OF THE FATIGUE PERFORMANCE OF VISCO-ELASTIC PANELS AT ELEVATED TEMPERATURES,
by R. V. Bennett. Feb 65, 109p
Contract NAS1 3193
NASA CR-162
Unclassified report

Descriptors: (*Panels(Structural), Viscoelasticity), (*Fatigue(Mechanics), Panels(Structural)), High-temperature research, Aluminum, Riveted joints.

N65-18201 Field 13K
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INVESTIGATION OF A LIQUID-FLUORINE INDUCER AND MAIN-STAGE PUMP COMBINATION DESIGNED FOR A SUCTION SPECIFIC SPEED OF 20000,
by Walter M. Osborn. Mar 65, 19p
NASA-TM-X-1070
Unclassified report

Descriptors: (*Turbopumps, Rocket components), (*Liquefied gases, Impellers).

N65-19851 Field 13G
CFSTI Prices: HC$1.50 MF$0.75

Midwest Research Inst., Kansas City, Mo.
ADVANCED VALVE TECHNOLOGY,
by Kenneth D. May. Feb 65, 181p
NASA SP-5019
Unclassified report

Descriptors: (*Valves, Performance(Engineering)), (*Mechanical engineering, Valves).

N65-22356 Field 13H
CFSTI Prices: HC$4.00 MF$1.00

General Electric Co., Philadelphia, Pa.
ELECTROFORMING ALUMINUM FOR SOLAR ENERGY CONCENTRATORS,
by Ferenc J. Schmidt and Irving J. Hess. Apr 65, 121p
Contract NAS1 3309
NASA CR-197
Unclassified report

Descriptors: (*Aluminum, Electroforming), (*Electroforming, Aluminum).

N65-23818 Field 13I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
AN APPROXIMATE DETERMINATION OF THE EFFECTS OF GEOMETRY ON BAL-BEARING TORQUE AND FATIGUE LIFE,
by John T. Mayer and Thomas C. Litzler. May 65, 24p NASA-TN-D-2792
Unclassified report

Descriptors: (*Ball bearings, Life expectancy), (*Fatigue(Mechanics), Ball bearings), Geometry, Determination, Failure(Mechanics).

Patent 3,188,844 Field 13I

ELECTRICAL DISCHARGE APPARATUS FOR FORMING.
Patent assigned to NASA,
by Robert J. Schwinghamer. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Explosive forming, Electric discharges), (*Industrial equipment, Explosive forming), Patents, Dies, Electrodes, Wire, Conical bodies, Shock waves, Electric switches.

The apparatus is for manufacturing metal parts in large sizes with complex configurations. The apparatus includes a blast head with a cone shaped chamber and a die block in cooperative relationship with it which has a forming cavity aligned with the chamber. The metal blank which is to be formed separates the chamber from the forming cavity. A shock wave generated by an explosive is used to shape the blank.

Patent 3,189,403 Field 13H, 11G

TANNING WITH A HEMIACETAL AND RESORCINOL OR PYROGALLOL SOLUTION.
Patent assigned to Agriculture,
by Wallace Windus and Mary V. Hannigan. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Tanning, Leather), Animals, Phenols, Acetals, Formaldehyde, Resorcinol, Leather, Patents, Skin.

The process is for tanning all animal skins. The combination tannage of 'Aldocryl' and a phenol such as resorcinol or pyrogallol gives a leather product from a domestic sheepskin which is full, mellow, does not darken in light, has an exceptionally high shrink temperature, and is resistant to shrinkage by perspiration. 'Aldocryl' is the trade name for a hydroxy-containing hemi-acetal.

Patent 3,189,419 Field 13H

ZONE-MELTING CRYSTALLIZATION TECHNIQUE.
Patent assigned to AEC,
by William R. Wilcox. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Zone melting, Crystallization), (*Crystallization, Zone melting), Patents, Purification.

The apparatus generates free convection currents within the molten zone of a zone-melting process in order to produce stirring of a liquid. Zone-melting is useful in research and manufacture for purifying metals, semiconductors, organic and inorganic chemicals, particularly in the field of solid-state electronics.

Patent 3,189,473 Field 13I

METHOD OF MAKING A CONTAINER.
Patent assigned to Air Force,
by Berthold C. Weber. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Crucibles, Liquid metals), (*Casting, Crucibles), Patents, Containers, Zirconium compounds, Dioxides, Titanium, Powders, Alcohols, Refractory materials, Castings, Heat treatment, Vacuum, Manufacturing methods, Molding.

The container may be in the form of a crucible or mold for molten titanium. A mixture is formed of 93.5 percent ZrO_2 powder and 6.45 percent Ti powder in a suspension formed by the addition of methyl alcohol. The suspension formed by the addition of methyl alcohol. The suspension is cast into a desired shape, is air dried, fired at from 1760 to 1870 degrees C. in a vacuum and is then cooled in the vacuum.

Patent 3,189,726 Field 13A, 20C

HIGH TEMPERATURE HEAT SOURCE.
Patent assigned to NASA,
by Alex Vary. 15 Jun 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Thermal radiation, Sources), (*Thermionic emission, Electrodes), Patents, Heating elements, High-temperature research, Thermal expansion, Helixes, Heaters.

The high temperature source of thermal radiation is utilized for heating emitter electrodes in thermionic devices. A pair of spaced heating elements in the form of ribbons are curved to a helical configuration about a common center line. The broad radiationg surface enables the object being heated to approach very closely the temperature of the ribbons.

Patent 3,189,791 Field 13L

GROUNDING DEVICE FOR ROTATING MACHINERY EXPECIALLY FOR BLOWERS.
Patent assigned to Navy,
by Thomas P. Kirkpatrick. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Ground(Electrical), Safety devices), (*Safety devices, Ground(Electrical)), (*Machines, Ground(Electrical)), Rotation, Blowers, Circuits, Shafts.

The grounding device is used with a rotating shaft, especially the shaft of a turbine-driven blower. An electrical circuit is so associated with a rotor of the rotary machine that stray voltages are drained from the rotor through a path that excludes the bearings of the rotor.

Patent 3,189, 916 Field 13I

HAND CRIMPING TOOL.
Patent assigned to Navy,
by Carl W. Magee. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Crimping tools, Pipes), Patents, Waveguides, Mechanical working, Portable.

The hand tool is for crimping two concentrically mounted tubes together so that there cannot be any relative rotation between the two tubes. The tubes are used in the waveguide art. The tool has a plurality of crimping levers that are pivotally mounted within a cylindrical body. Each lever has a crimping tip on one end. A tapered shaft is slidably positioned within the cylindrical body. An outer handle is provided on one end of the cylindrical body and an inner handle is provided on one end of the tapered shaft. Upon moving the handles together, the tapered shaft causes the crimping levers to be pivoted about a fulcrum point and the crimping tips are pivoted inwardly.

Patent 3,191,386 Field 13J, 13M, 13B, 8H

HOVERING BAG BREAKWATER.
Patent assigned to Navy,
by Robert L. Wiegel and Richard A. Friend.
29 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Breakwaters, Inflatable structures), (*Inflatable structures, Breakwaters), Portable, Structures, Bags(Containers), Plastics, Patents, Hydrology.

The hovering bag breakwater is used in a natural body of water adjacent to a shore thereof for protecting that portion of the body of water between the breakwater and the shore from impact of high amplitude low frequency water waves. The bag of plastic materials is filled with ambient water.

Patent 3,191,907 Field 13K

CONICAL VALVE PLUG.
Patent assigned to NASA,
by Harold W. Schmidt. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Plug valves, Conical bodies), (*Seals(Stoppers), Plug valves), Design, Patents, Liquids, Cryogenics, Fluids, Configuration.

The conical walled valve plug is adapted to cooperate with a valve seat having a recessed seating face of a spherical configuration. The valve controls the flow of cryogenic fluids which are used as fuels in space vehicles and as coolants for electronic equipment.

Patent 3,192,305 Field 13A, 13H

FLUID COOLING OF ELECTRICAL CONDUCTORS.
Patent assigned to Army,
by William W. Erbe. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Vapor plating, Industrial equipment), (*Cooling, Industrial equipment), (*Liquid cooled, Electrical equipment), Patents, Electrodes, Containers, Epoxy plastics, Coolants, Coatings.

The cooling jacket is for electrical conductors associated with an evaporation coating machine. The machine is used to evaporate a metal for coating an optical mirror. The jacket is made of an epoxy resin which encases the electrical conductor. A cooling fluid is brought into and out of the jacket.

PB-167 647 Field 13J, 21F
CFSTI Prices: HC$1.00 MF$0.50

General Dynamics Corp., Groton, Conn. Electric Boat Div.
SUBMARINE TANKERS. SUMMARY OF A FEASIBILITY REPORT.
1964, 23p Unclassified report
Contract MA1718
Original document contains color. Reproduction is made only in black and white.

Descriptors: (*Submarines, Tankers), (*Tankers, Submarines), (*Nuclear powered vessels, Submarines), Feasibility studies, Submarine hulls, Design, Handling, Velocity, Marine nuclear propulsion.

This study investigated the principal dimensions and power required for nuclear-powered submarine tankers of three different hull forms -- one with a draft limitation -- designed to carry 20,000, 30,000, and 40,000 tons of cargo dead-weight, and at speeds of 20, 30, and 40 knots submerged. One of the 27 ensuing designs was then selected by the Maritime Administration for a more detailed study. The vessels described in the report are purely commercial, with no special features included to adapt them to military use. Furthermore, no attention was given to the economics of operation of such vessels.

PB-167 684 Field 13J
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
SHIP SLAMMING IN HEAD SEAS,
by V. G. Szebehely and M. A. Todd.
Feb 55, 80p Rept. no. 913
AD 058 722
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Ships, Pitch(Motion)), (*Ocean waves, Ships), Seas, Iterative methods, Pressure, Ship hulls, Hydrodynamics, Mechanics, Acceleration, Design, Velocity.

The hydrodynamics, the kinematics, and the effects of slamming are discussed. Present methods of ship-motion prediction are used to study the conditions which lead to slamming of ships in head seas. If wave length and wave height are given as well as the length, draft, and speed of a ship of normal design, the possibility of the emergence of the forefoot can be predicted from a graph. An iterative procedure is described to estimate slamming force, acceleration, and pressure distribution on the bottom of a slamming ship. General discussions and results are presented in the body of the text; derivations and detailed computations are given in appendixes. (Author)

PB-167 768 Field 13G, 14B
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
PNEUMATIC CALIBRATION CONSOLE MODEL 3137 (KING NUTRONICS CORPORATION).
Instrument calibration procedure technical manual.
1 Dec 64, 22p NAVWEPS-17-20MP-05
Unclassified report

Descriptors: (*Test equipment, Pneumatic devices), (*Pneumatic devices, Calibration), Instruction manuals, Test methods, Loading(Mechanics), Gages.

The manual provides a method for calibrating and functionally testing the King Nutronics Corporation model 3137 pneumatic calibration console. The model 3137 is of modular construction, and contains five gage modules installed in a single desk top cabinet. The gage module being tested and the dead-weight tester being used will be referred to herein as the Test Instrument and the standard, respectively.

PB-167 770 Field 13H, 12B
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Program in Operations Research.
THE OPTIMAL INVENTORY POLICY FOR BATCH ORDERING,
by Arthur F. Veinott, Jr. 21 Aug 64, 16p
Technical rept. TR-3
Grant NSF GP1625 Unclassified report

Descriptors: (*Inventory control, Optimization), Operations research, Commerce, Costs, Industrial procurement, Scheduling, Distribution(Economics).

A single product dynamic inventory problem is considered in which the demands in each period are independent and identically distributed random variables. There is a constant lead time, a discount factor 0 < or = alpha < or = 1, a unit ordering cost c and an expected holding and penalty cost function L(.) for which - (c(1-alpha)y + L(y)) is unimodal, and total backlogging of unfilled demand. In addition each order for stock must be in some nonnegative integral multiple of Q, a fixed positive constant. It is shown that the (k, Q) policy is optimal for the finite and infinite period models. With the (k, Q) policy if the initial inventory on hand and an order in a period is less than k, an order is placed for the smallest multiple of Q that will bring the inventory on hand and on order to at least k; otherwise, no order is placed. The optimal value of k is easy to compute and is the same for the finite and infinite period models. The results are generalized to the case where the demand distributions and cost functions vary over time. The (k, Q) policy is not optimal in general for the case where there is also a fixed charge for placing an order. (Author)

PB-167 823 Field 13H, 7A
CFSTI Prices: HC$1.00 MF$0.50

Springfield Armory, Mass.
ELECTROPLATING: PART I. THEORY OF THE MECHANISM OF FUSED SALT ELECTROPLATING,
by Francis X. Hassion and Joseph Szanto. 11 Mar 65, 24p Technical rept. no. SA-TR18-1092
Proj. M1 5 50018 01M1M6
AD 461 183

Unclassified report

Descriptors: (*Electroplating, Theory), Reaction kinetics, Thermodynamics, Salts, Melting, Electrodeposition.

A theory is presented on the kinetics and thermodynamics of fused salt electroplating. From common electroplating data, the rate-determining plating reaction, the activation energy, and also the ionization potential of the metallic ion can be inferred. Heats and entropies of mixing can also be found for the plated species in the fused salt bath. The conditions for plasma formation and for establishing the equilibrium liquidus composition can also be determined. (Author)

PB-167 824 Field 13H, 7D
CFSTI Prices: HC$1.00 MF$0.50

Springfield Armory, Mass.
ELECTROPLATING: PART II. KINETICS OF TYPICAL FORWARD AND REVERSE ELECTRODE REACTIONS,
by Francis X. Hassion and Joseph Szanto.
24 Mar 65, 21p Technical rept. no. SA-TR18-1093
Proj. M1 5 50018 01M1M6
AD 462 089

Unclassified report

Descriptors: (*Electroplating, Reaction kinetics), Electrochemistry, Electrodes, Mathematical analysis, Oxidation, Oxides, Steel, Diffusion.

Typical forward and reverse electrode reaction sets are presented, and analyses are performed which allow complete stepwise interpretation of the electrochemical reactions once the necessary experimental data have been obtained. Diffusion and field conductance losses are ignored - conditions, for which this is appropriate, being stated - and transient behavior is approximated by an 'average value' treatment. Checks on the self-consistency of the analyses are indicated. (Author)

PB-167 839 Field 13J, 9B
CFSTI Prices: HC$4.00 MF$1.00

Maritime Administration, Washington, D. C.
LEAST COST SHIP CHARACTERISTICS BY COMPUTER TECHNIQUES,
by Robert D. Murphy, Donald J. Sabat, and Robert J. Taylor. 1963, 132p

Unclassified report

Presented to the Chesapeake Section of the Society of Naval Architects and Marine Engineers, October 23, 1963, Washington, D. C.

Descriptors: (*Cargo ships, Design), Costs, Programming(Computers), Digital computers, Volume, Weight, Center of gravity, Velocity.

This paper presents a systematic procedure utilizing computer techniques to determine the optimum combination of Length, Beam, Draft, Block Coefficient and Depth to satisty a predetermined 'least cost' criterion for a dry cargo ship, which will meet a given set of Owner's Requirements for Speed, Fueling Range, Stowage Factor and Cargo Deadweight. The 'least cost' ship is obtained from a family of ships resulting from the permutation of four values each of five basic design variables. Selection of the 'least cost' ship is dependent upon the computer programming of standard preliminary design processes. The procedure is so designed that only those ships consistent with good design practice and existing regulatory requirements will be considered. The methodology, examples of actual applications and analysis of results obtained, are the principal features of the paper. The listing of the IBM 7090 program, developed for the determination of the 'least cost' ship, is included. (Author)

PB-167 854 Field 13J
CFSTI Prices: HC$2.00 MF$0.50

David Taylor Model Basing., Washington, D. C.
ENVIRONMENTAL CONDITIONS OF SHIP MOTIONS AND VIBRATIONS FOR DESIGN OF RADAR SYSTEMS ON DESTROYERS AND AIRCRAFT CARRIERS.
Research and development rept.,
by E. Buchmann and J. D. McConnell. Jul 59, 34p
Rept. no. 1298
AD 224 898

Unclassified report

Descriptors: (*Vibration, Ships), (*Destroyers, Radar antennas), (*Aircraft carriers, Radar antennas), (*Radar antennas, Design), Mathematical analysis, Shipborne, Ship antennas, Environmental tests, Statistical distributions, Motion.

From rigid-body motions and environmental vibrations measured on aircraft carriers and destroyers over a wide range of service conditions, environmental conditions of vibration and ship motions are defined for use in the design of radar installations. Statistical distribution patterns of motions applicable to ship operation over a long period and those for the most adverse operating conditions experienced in a severe sea are used to predict extreme values. Maximum linear accelerations in the longitudinal, athwartship, and vertical directions and maximum angular accelerations at the radar platform are estimated. Applications of the data to design problems are discussed.

PB-167 858 Field 13M, 13B
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Berkeley. Structures and Materials Research.
PRECAST CHEMICALLY PRESTRESSED CONCRETE FRAME,
by Vitelmo V. Bertero and Guillermo J. Iragorry Montero. Oct 63, 55p Rept. no. SESM-63-4
Grant NSF GP616

Unclassified report

Descriptors: (*Reinforced concrete, Structural parts), Reinforcing materials, Model tests, Rods, Loading(Mechanics), Stresses, Structures, Mathematical analysis.

The report describes in detail the fabrication and experimental studies of two prestressed concrete frame models. The fabrication of the models was carried out in order to investigate the feasibility of constructing concrete frames by connecting simple precast chemically prestressed structural elements. All elements had a 2.7/8 by 4-inch rectangular cross section and a nominal length of about 40 inches. Total percentage of reinforcement was 1.74. The structural elements were all self stressed by chemical prestressing through the use of an expansive cement developed recently at the University of California, Berkeley. History of expansion and the corresponding stresses developed during the curing process of these elements are presented. To assure continuity at the knees of the frames, the connections between the precast prestressed elements were developed by the use of special end-bearing plates and high-strength steel bolts. The experimental work consisted of a series of tests programmed to study the mechanical behavior of the simple structural elements and of the frames under proportional loading. (Author)

PB-167 882 Field 13C
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.
A BASIC STUDY OF EXPANSIVE CEMENT AND EXPANSIVE CONCRETE.
Progress rept.,
by V. Bertero, D. Pirtz, and M. Polivka. 20 Apr 64, 32p
Grant NSF GP616

Unclassified report

Descriptors: (*Cements, Structural properties), (*Concrete, Structural properties), Physical properties, Reinforced concrete, Structural parts, Mechanical properties, Reinforcing materials, Bonding.

An investigation was made of the physico-chemical characteristics of expansive cement compositions, the physical and of mechanical properties of pastes, mortars, and concretes containing expansive cement, and the basic factors which govern the behavior of expansive concrete structural elements.

PB-167 892 Field 13I
CFSTI Prices: HC$3.00 MF$0.75

Sibley School of Mechanical Engineering, Cornell Univ., Ithaca, N. Y.
DYNAMICALLY LOADED JOURNAL BEARINGS: MOBILITY METHOD OF SOLUTION,
by J. F. Booker. 1964, 58p
Grant NSF G21836E

Unclassified report

*Available copy will not permit fully legible reproduction.

Descriptors: (*Journal bearings, Loading(Mechanics)), (*Loading(Mechanics), Journal bearings), Motion, Differential equations, Mathematical analysis, Dynamics, Graphics, Boundary value problems, Lubrication.

An approach is presented for simplified analytical, graphical, and numerical solutions to extremely general problems of dynamically loaded bearings. A series of examples illustrates the application of the method to problems of varying complexity. (Author)

PB-167 918 Field 13I
CFSTI Prices: HC$6.00 MF$1.25

Naval Engineering Experiment Station, Anapolis, Md.
PRELIMINARY INVESTIGATION OF THE NOISE OUTPUT AND THE CAUSES OF NOISE OF SIX 300 KW REDUCTION GEAR PINIONS,
by M. G. McGraw. 2 Feb 51, 202p
Rept. no. EES-5A966799
Proj. NS631 097
AD 201 004

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Reduction gears, Gear noise), (*Gear noise, Reduction gears), Sound, Lubrication, Sprays, Velocity, Steel, Aluminum alloys, Copper alloys, Experimental data, Transmission gears.

The report covers the sound test results, both structure-borne and air-borne, and auxiliary data obtained in the tests of six pinions running with a standard bull gear.

PB-167 962 Field 13E, 13A, 18L
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleares.
SEALED COUPLING FOR AN ELECTRICAL HEATING CONDUCTOR WITH COAXIAL SHEATH (PATTERN 1964) (Raccord Etanche pour Conducteur Electrique Chauffant a Gaine Coaxal (type 1964),
by Philippe Arragon, Robert Aubert-Chevallier, Jean Gentil, Maurice Seguin, and Marc Vilcot.
Mar 65, 15p Rept. no. CEA-R-2755

Unclassifed report

Text in French, attached summary in English.

Descriptors: (*Couplings, Heating elements), (*Heating elements, Power reactors), Electric connectors, Coaxial cables, Resistance(Electrical), France.

Many irradiation devices call for supplementary electrical heating which can provide a constant temperature. A coupling is described whose high performance makes it possible for the sheathed electrical resistance to provide maximum power. Since this coupling is sealed and does not require special cooling, it may be placed in any position on the irradiation device. (Author)

PB-167 976 Field 13B
CFSTI Prices: HC$1.00 MF$0.50

Public Health Service, Washington, D. C. Div. of Air Pollution.
AIR POLLUTION, A NEW RESPONSE TO AN OLD PROBLEM,
by Vernon G. MacKenzie. 1965, 24p
Rept. no. 65-2 Unclassified report

Presented at the 1965 Annual Meeting of the Air Pollution Control Association, Royal York Hotel, Toronto, Ontario, Canada, 20-24 Jun 65.

Descriptors: (*Air pollution, Control), Public health, United States Government, Federal budgets, Law, Urban areas, Attitudes, Public opinion, Costs.

PB-168 007 Field 13H
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
STUDY OF THE MACHINING OF URANIUM CARBIDE RODS OBTAINED BY CONTINUOUS CASTING UNDER ELECTRONIC BOMBARDEMENT (Etude de l'Usinage de Barreaux de Carbure d'Uranium Obtenus par Coulee Continue sous Bombardement Electronique),
by Pierre Rousset and Andre Accary. Jul 65, 41p Rept. no. CEA-R-2733
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Machining, Carbides), (*Uranium compounds, Carbides), Rods, Castings, Electron bombardment, Effectiveness.

The investigation considers the various methods of machining uranium mono-carbide and compares them critically in the case of their application to uranium carbide obtained by fusion under an electronic bombardment and continuous casting. This study leads to the proposal of two mechanical machining methods: cylindrical rectification and centerless rectification, preceeded by a preliminary roughing out of a cylinder, the latter appearing more suitable. A study of the machining yields as a function of the diameter of the rough bars and of the diameter of the finished rods has shown that an optimum value of the rough bar diameter exists for each value of the finished rod diameter. It is found that the yield increases as the diameter itself increases, this yield rising from 45 per cent to around 70 per cent as the diameter of the rough bars increases from 25-26 mm to 37-38 mm. (Author)

UCRL-12203 Field 13H, 18J
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
An Explosvely Driven Pipe Closure,
by Donald H. Gipson. 15 Feb 65, 9p N65-20695
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Pipes, Seals(Stoppers), (*Seals-(Stoppers), Explosive forming).

14. Methods and Equipment

AD-458 883 Field 14E
CFSTI Price: HC$3.00

Army Ballistic Missile Agency, Redstone Arsenal, Ala. Flight Instrumentation Planning and Analysis Section.
BALLISTIC CAMERA DATA REDUCTION ANALYSIS PROCEDURES,
by Lester F. Keene. 24 May 60, 59p
Rept. no. DMTR-TR-26-60

Available copy will not permit fully legible reproduction.

Descriptors: (*Ballistic cameras, Photointerpretation), (*Data processing systems, Photointerpretation), (*Photointerpretation, Data processing systems), Photographic techniques, Atmospheric refraction, Errors, Corrections, Matrix algebra.

The use of ballistic cameras is studied and a step-by-step analysis of the mathematical data reduction is developed. Included in the mathematical treatment is a section on atmospheric refraction correction. (Author)

N65-17126 Field 14B
CFSTI Prices: HC$4.00 MF$0.75

National Research Corp., Cambridge, Mass.
GAUGE CALIBRATION STUDY IN EXTREME HIGH VACUUM,
by F. Feakes, F. L. Torney, Jr., and F. J. Brock.
Feb 65, 99p
Contract NASw625
NASA CR-167
Unclassified report

Descriptors: (*Meters, Calibration), (*Densimeters, Vacuum), (*Pressure gages, Vacuum), Ionization gages, Magnetrons, Gages.

N65-18203 Field 14B
CFSTI Prices: HC$5.00 MF$1.25

Geophysics Corp. of America, Bedford, Mass.
MEASUREMENT OF THE LOWEST PRESSURES IN SPACE AND THE LABORATORY,
by Wallace Kreisman. Feb 65, 182p
Contract NASw705
NASA CR-154
Unclassified report

Descriptors: (*Vacuum apparatus, Design), (*Vacuum, Measurement), Vacuum pumps, Space environmental conditions.

N65-19918 Field 14B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
TECHNIQUES FOR IMPROVING THE OPENING OF THE MAIN DIAPHRAGM IN A LARGE COMBUSTION DRIVER,
by Robert E. Dannenberg and David A. Stewart.
Mar 65, 16p NASA-TN-D-2735
Unclassified report

Descriptors: (*Wind tunnels, Diaphragms(Mechanics)), (*Diaphragms(Mechanics), Shock tubes).

N65-20486 Field 14B, 1A
CFSTI Prices: HC$4.00 MF$0.75

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A PERFECT-GAS ANALYSIS OF THE EXPANSION TUNNEL, A MODIFICATION TO THE EXPANSION TUBE,
by Robert L. Trimpi and Linwood B. Callis.
Apr 65, 101p NASA-TR-R-223
Unclassified report

Descriptors: (*Wind tunnels, Analysis), (*Shock tubes, Analysis).

N65-21165 Field 14B, 9E
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A VERTICAL TEST RANGE FOR ANTENNA RADIATION MEASUREMENTS,
by John Steckel and William Korvin. Apr 65, 22p
NASA-TN-D-2752
Unclassified report

Descriptors: (*Radio ranges, Antenna radiation patterns), (*Antenna radiation patterns, Radio ranges).

N65-22608 Field 14B, 13A, 20M
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
FEASIBILITY OF USING A THROTTLING CALORIMETER FOR LIQUID-METAL VAPOR QUALITY MEASUREMENTS,
by Ted W. Nyland. May 65, 15p NASA-TN-D-2802
Unclassified report

Descriptors: (*Liquid metals, Vapors), (*Calorimeters, Feasibility studies).

Patent 3,189,802 Field 14B

VIBRATING CAPACITOR WITH A COATED REFERENCE ELECTRODE.
Patent assigned to Navy,
by William A. Zisman. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Metals, Ionization potentials), (*Measuring device(Electrical + electronic), Voltage), Patents, Capacitors, Vibration, Electrodes, Plastic coatings, Halocarbon plastics, Stability.

The apparatus is for the measurement of contact potential differences between two metals. An improved reference electrode of remarkable stability to change in surface potential is obtained by covering the face or working surface of the electrode with a thin solid layer of a fully fluoriented hydrocarbon polymer such as Teflon.

Patent 3,189,817 Field 14B

DEVICE FOR TESTING METAL SHEETS BY MEASURING THE TIME REQUIRED FOR ELECTROMAGNETIC PULSES TO PASS THERETHROUGH.
Patent assigned to AEC,
by Claus John Renken, Jr. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Test equipment, Metals), (*Non-destructive testing, Test equipment), (*Electromagnetic pulses, Non-destructive testing), Patents, Sheets, Coils, Wave transmission.

The device detects subsurface irregularities in metal sheets. A pulsed signal is passed through the metal sheet and measures the time delay thereof caused by the metal sheet to detect subsurface irregularities therein, which time is independent of the coil-to-metal sheet spacing. Since a pulsed signal is used, the size of the coils is materially reduced over those of the prior art and greatly improved resolution is obtained therefrom.

PB-167 641 Field 14E
CFSTI Prices: HC$1.00 MF$0.50

Bell and Howell Research Center, Pasadena, Calif.
NON-AQUEOUS SILVER-HALIDE RAPID ACCESS PHOTOGRAPHY.
Quarterly rept. no. 1, 1 Jan-31 Mar 64,
by Viron V. Jones. 31 Mar 64, 14p
Contract DA36 039AMC03711E, Proj. 1G6 20901A040
AD 443 649
Unclassified report

Descriptors: (*Reconnaissance film, Processing), (*Photographic chemicals, Selection), Solvents, Glycols, Alcohols, pH, Photographic contrast, Antifogging agents, Photographic emulsions, Gels, Polymers.

The general objective of the work is to investigate low-volatility non-aqueous processing solutions for silver halide aerial reconnaissance films; to incorporate successful formulations in gel layers on a suitable supporting web. Ethylene glycol and methanol are the only non-aqueous solvents found thus far in which Plus X film may be developed. Development requires very high alkalinity, and only a few of the many developing agents tried will give good contrast. The major effort was put on the ethylene glycol system. Other solvents were tried and discarded because the essential reagents were not soluble in them. A search was made for materials which would act as restrainers (antifoggants) and developer accelerators in the glycol system without positive results. A two stage (develop and fix) system appears possible. No gelling agent has yet been found suitable for forming the processing layers for a glycol system. For this, over a dozen natural and synthetic polymer products have so far been investigated. (Author)

PB-167 810 Field 14B
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Washington, D. C.
GYROSCOPE TEST SET AN/ASM-117
PART NO. Y63-315880-483 (FORMERLY PART NO. TG-62).
Instrument Calibration Procedure Manual.
1 Feb 65, 16p NAVWEPS-17-20QT-01 superseded
Unclassified report

This publication supersedes NAVWEPS-17-20QT-01 dated 15 Mar 64, PB-181 699.

Descriptors: (*Test equipment, Gyroscopes), (*Gyroscopes, Test sets), (*Test sets, Calibration), Instruction manuals, Test methods.

The manual contains calibration instructions that will enable calibration personnel to determine whether the equipment is operating within the prescribed specification limitations. It also includes a list of calibration equipment, corrective action instructions, and instructions for the evaluation and recording of data.

PB-167 885 Field 14B, 8M
CFSTI Prices: HC$2.00 MF$0.50

IIT Research Inst., Chicago, Ill. Technology Center.
PIEZOELECTRIC GAGES FOR DYNAMIC SOIL STRESS MEASUREMENT,
by E. T. Selig and E. Vey. Jan 64, 44p
Grant NSF G23495E
Unclassified report

Prepared for presentation at Annual Meeting Highway Research Board, (43rd), Washington, D. C.

Descriptors: (*Piezoelectric gages, Soil mechanics), Soils, Stresses, Density, Sensitivity, Sand, Calibration, Disks, Measurement.

A study was made of the suitability of piezoelectric gages for the measurement of dynamic stresses in soil. A number of variations of thickness-diameter ratio were investigated as well as several simple methods of sensor encasement. The gages were tested statically and dynamically under fluid pressure and embedded in both confined and constrained specimens of sand. The disk-shaped piezoelectric sensor from which the gages were constructed was found to have high electrical sensitivity, high stiffness, and be suitable for miniaturization. It is, however, sensitive to moisture, electromagnetic radiation, temperature, and distortions produced by shearing stresses, bending moments and lateral pressures. Measurements made with the gages embedded in sand showed that 1) the static and dynamic gage sensitivities are the same, 2) the gage response is influenced by soil density, confining pressure and placement techniques, and 3) the gage output is a nonlinear function of applied stress when the soil-stress-strain relationship becomes appreciably nonlinear. It was clear from the study that an elaborate stress gage design is required to isolate the sensing element from all of the undesirable influences. A more refined gage is currently under development. (Author)

PB-167 894 Field 14D, 16A
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
SEARCH RULES FOR AUTOMATIC FAULT LOCATION,
by Sidney I. Firstman and Brian Gluss. 15 Jan 60,
36p Research memo. no. RM-2514
AD 237 092

Unclassified report

Prepared in cooperation with Armour Research Foundation, Chicago, Illinois.

Descriptors: (*Search theory, Test methods), (*Test methods, Search theory), (*Malfunctions, Search theory), Modules(Electronics), Maintenance, Operations research, Probability.

Automatic testing equipment is being developed and, to a limited extent, used to diagnose malfunctions in equipment and to locate the faulty part. What might be called an engineering-logic method is generally used to develop the search routines that are programmed on the automatic testing equipment; but this method is difficult and time-consuming. This memorandum develops search rules, founded on probabilistic concepts, to supplement this engineering-logic method. These rules spell out the preferred order of conducting tests to find the faulty part in the shortest possible time. A two-step search process is considered: first the faulty module must be found, and then the faulty component within the module must be found. For a remove-and-replace maintenance philosophy the two stages are independent--either can be used without the other. Methods of estimating the required parameters are discussed and a technique is presented for taking account of fault symptoms when developing the search program. For exact application of the search rules, some extremely difficult parameter estimation problems could be encountered. However, if there is only a negligibly small chance that the testing machine calls a good module bad, then it is shown that an approximately optimum rule is the common sense search rule of looking first at the module that has the greatest potential payoff (in terms of chance of containing the faulty component) per time spent testing the module, then at the next greatest, and so forth. (Author)

PB-167 907 Field 14E, 11I, 13H
CFSTI Prices: HC$1.00 MF$0.50

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
PERMANENT MARKING ON POLYETHYLENE,
by Andrew R. Forgie. Aug 54, 9p
Technical rept. no. TR-2048
Projs. TB4 721B, 593 13 004
AD 39 307

Unclassified report

Descriptors: (*Polyethylene plastics, Identification), (*Ink, Polyethylene plastics), Colors, Printing, Penetration, Packaging.

Satisfactory inks were developed for marking untreated polyethylene. These inks may be applied by brush, silk-screen printing, or stencil but are not suitable for stamp pads or printing presses at this time. The color, depth or penetration, non-bleeding qualities, and permanency are very satisfactory for the red, black, and blue inks. Some yellows, oranges, and greens tend to bleed or migrate, but more careful selection of coloring materials for these colors (as in Formulas 112 and 115) overcame this problem. (Author)

PB-167 997 Field 14B, 22D
CFSTI Prices: HC$2.00 MF$0.50

Ballistic Research Labs., Aberdeen Proving Ground, Md.
A CANTILEVER FOR MEASURING AIR BLAST,
by W. O. Ewing and J. W. Hanna. Aug 57, 40p
Technical note no. BRL-TN-1139
Projs. 5B03 04 002, TB3 0112

Unclassified report

Descriptors: (*Airburst, Test equipment), (*Pressure gages, Blast), (*Contilever beams, Pressure gages), Air, Measurement, Calibration.

This note describes the use of aluminum cantilever beams as air blast gages. The beam gage was designed in an attempt to fill a need which exists for an instrument suitable for the recording of blast pressures under test conditions which do not permit use of conventional recording methods. Construction details are given and procedure for calibration of the beams is described. Calibration results are tabulated and presented graphically. (Author)

PB-168 002 Field 14B
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
HIGH SPEED PULSED MAGNETIC FIELDS MEASUREMENTS, USING THE FARADAY EFFECT (Mesures de Champs Magnetiques Pulses Rapides a l'aide de l'Effet Faraday).
Doctoral thesis,
by Alain Dillet. 16 Dec 64, 63p
Rept. no. CEA-R-2769 Unclassified report

Text in French, attached summary in English.

Descriptors: (*Magnetic fields, Measurement), (*Magneto-optic effect, Magnetic fields), Light pulses, Polarization, Rotaton, Photomultipliers, Oscilloscopes, Test methods.

For these measures, the informaton used is the light polarizaton plane rotation induced by the magnetic feld in a glass probe. This rotation is detected using a polariser-analyser couple. The detector is a photomultiplier used with high-current and pulsed light. In a distributed magnet (gap : 6 X 3 X 3 cm) magnetic fields to measure are 300 gauss, lasting 0,1 microseconds with rise-times < or = 35 ns, repetition rate: 1/s. An oscilloscope

is used to view the magnetic field from the P.M. Plate signal. The value of the field is computed from a previous static calibration. Magnetic fields from 50 to 2000 gauss (with the probe now used) can be measured to about 20 gauss ± 5 per cent, with a frequency range of 30 MHz. (Author)

PB-168 006 Field 14B, 7D
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
MECHANICAL TIME-SHUTTER FOR SPECTROGRAPH WITH EXPOSURE-TIMES FROM 1.5 MICROSECONDE TO 3 MILLISECONDES (Un Obturateur Mecanique pour Spectrographe dont le Temps d'Exposition varie de 1,5 Microseconde a 3 Millisecondes),
by Lothar Becker and Hans-Werner Drawin.
Jun 65, 27p Rept. no. CEA-R-2816
EUR 2440 f

Unclassified report

Text in French, summary in English.

Descriptors: (*Camera shutters, Spectrum analyzers), (*Spectrum analyzers, Camera shutters), Electric discharges, Spectroscopy, Control systems, Electronic equipment, France.

A mechanical time-shutter for exposure-times ranging from 1,5 microseconds to 3ms is described. The apparatus is designed for spectrographic observations of pulsed electrical discharges which show rapidly varying spectral emissivities. For the mechanical part of the shutter we used a specially formed fast rotating disk having a slit. Triggering of the discharge is achieved by the rotating disk - in connection with photocells. Both the instant at which - after the beginning of the electrical discharge - the exposure shall begin, and the duration of exposure which will then follow can be 'preselected' on a special electronic control device. All functions: rotation of the disk - ignition of the discharge - exposure - switch-off of the disk are controlled electronically. The principle and the main electronic control parts of this versatile instrument are described. (Author)

UCRL-7895 (Rev. 1) Field 14B
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
STABILITY OF A SPHERICAL GAS DETONATION,
by R. E. Duff, and M. Finger. Nov 64, 5p
Contract W-7405-ENG-48

Unclassified report

Descriptors: (*Gases, Detonations), (*Detonation waves, Gases).

15. Military Sciences

AD-446 445 Field 15B, 13A
CFSTI Price: HC$6.00

Battelle Memorial Inst., Columbus, Ohio.
METHODS FOR DISPOSING OF EXCESS SHELTER HEAT.
Research rept.,
by John D. Hummell, David E. Bearint, and Lawrence J. Flanigan. Aug 64, 229p
Contract OCD OS62 191, Task 1422A
N64 33111

Unclassified report

Descriptors: (*Shelters, Cooling), (*Cooling + ventilating equipment, Shelters), Civil defense systems, Air cooled, Liquid cooled, Heat exchangers, Refrigeration systems, Design, Costs, Humidity, Vapors, Absorption, Radiation damage, Fuels, Maintenance, Ice, Air conditioning equipment, Driers(Apparatus).

Techniques appropriate for the removal of heat from most shelters probably differ somewhat from conventional methods for cooling occupied structures. Consideration must be given to such factors as: availability heat sinks, safety requirements, reliability, first cost of equipment, requirements for maintenance during stand-by periods, power requirements, the relatively short operating period, and comfort conditions within the shelter. Some of these factors are unique in protective shelter design and, therefore, cooling methods not conventionally used for comfort cooling were investigated during the program. The major topics in the report are: nuclear radiation effects, standby maintenance requirements, heat sinks, cooling system components, and refrigeration and dehumidification devices.

AD-449 102 Field 15G
CFSTI Prices: HC$1.00

RAND Corp., Santa Monica, Calif.
SOURCES OF TURBULENCE IN THE NEW NATIONS,
by Guy J. Pauker. Mar 62, 15p
Rept. no. P-2570

Unclassified report

Presented at the Symposium on the "The U. S. Army's Limited-War Mission and Social Science Research", held in Arlington, Va., 26-28 Mar 62.

Descriptors: (*Unconventional warfare, Social sciences), Guerrilla warfare, Counterinsurgency, Attitudes, Cold war, Communism, Public opinion, Government(Foreign).

PB-167 825 Field 15B
CFSTI Prices: HC$3.00 MF$0.75

Director of Engineering and Industrial Services, Edgewood Arsenal, Md.
COST ESTIMATES FOR PROVIDING BIOLOGICAL AGENT PROTECTION TO FALLOUT SHELTERS,
by John B. Petty, III and William L. Brooks.
Oct 64, 71p Rept. no. DEIS-1
Contract CDM SR61 45, Task 1141A
AD 450 737

Unclassified report

Descriptors: (*Biological warfare, Shelters), (*Shelters, Costs), (*Civil defense systems, Biological warfare), Decontamination, Cooling + ventilating equipment, Air intake filters, Buildings, Underground structures, Controlled atmospheres, Pressure, Construction, Feasibility studies.

It is estimated that biological agent protection can be provided in existing buildings to shelter the occupants who have not been infected nor contaminated for a cost per person of: Below-ground shelters, ventilated --$0.60, Below-ground shelters, unventilated --$6.34, Above-ground shelters, ventilated -- $5.06, Above-ground shelters, unventilated -- $10.43. For new construction these

estimates are: Below-ground shelters, ventilated -- $0.45, Below-ground shelters, unventilated -- $5.57, Above-ground shelters, ventilated -- $4.42, Above-ground shelters, unventilated -- $9.62. Protection can be provided to people who have not been infected but who have been contaminated by providing a decontamination facility in addition to the facilities mentioned above. It is estimated that the decontamination facilities can be provided to new construction and existing shelters for a cost per person of: Below-ground shelters -- $10.42, Above-ground shelters -- $25.48. (Author)

PB-167 994 Field 15B, 15C
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
A HANDBOOK FOR ESTIMATING MATERIAL REQUIREMENTS AND COSTS OF SHELTER DOORS SUBJECTED TO LONG-DURATION BLAST LOADING,
by D. A. Sandoval. 24 Oct 58, 42p
Memo. no. RM-2277
AD 225 891
Rept. on Proj. RAND. Unclassified report

Descriptors: (*Shelters, Doors), (*Doors, Shelters), (*Costs, Shelters), (*Materials, Shelters), Handbooks, Civil defense systems, Reinforced concrete, Steel, Beam(Structural), Pressures, Impact shock, Nuclear explosions, Shock resistance, Graphics, Jensile properties, Structural properties.

This report provides formulas and charts that may be used to estimate both the quantities of materials required and the approximate costs for various sizes of three types of shelter doors: reinforced concrete, solid-steel slab, and wide-flange steel beams. The results are presented for a range of overpressures up to 400 psi; resistance to nuclear and thermal radiation is not considered. Dimensionless charts give the thickness-to-span ratio, for two types of doors, as a function of the required static resistance; other charts give volume, weight, and cost information as functions of span and resistance. Because of their fixed structural characteristics, wide-flange beams are treated separately, and only weight and cost charts are presented. Wide-flange structural shapes prove to be lighter than solid-steel or reinforced concrete slabs. Reinforced concrete slabs are the most economical. Solid-steel slabs appear to be the most expensive, and large, thick slabs are not readily available; for small spans, however, steel slabs serve quite well, since they require little fabrication. (Author)

SB-501 Suppl. 1 Field 15C, 15B, 15F

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
CIVIL DEFENSE.
Price list, selective bibliography of government research repts. and translations for Jul 62-Apr 65.
Apr 65, 12p Unclassified report
Available free from the Clearinghouse.

Descriptors: (*Civil defense systems, Bibliographies), (*Bibliographies, Civil defense systems), Civil defense personnel, Radiation effects, Fires, Shelters, Blood plasma, Nuclear explosions, Warning systems, Dosimeters, Radiation monitors.

Lists 150 reports and translations added to the CFSTI collections during the period July 1962 through April 1965. Includes research on fallout and other shelters, community attitudes concerning civil defense, shelter occupancy tests, shelter materials, safety measures, social and psychological effects of nuclear warfare, training personnel for manning shelters and shelter costs.

16. Missile Technology

AD-427 687 Field 16A, 4B, 4A
CFSTI Price: HC$4.00

Air Force Cambridge Research Labs., Bedford, Mass.
THE OCEAN BREEZE AND DRY GULCH DIFFUSION PROGRAMS. VOLUME II.
Research rept.
ed. by Duane A. Haugen. Dec 63, 110p Unclassified report
Rept. no. AFCRL 63-791, vol. 2

Descriptors: (*Guided missile safety, Air pollution), (*Air pollution, Guided missile ranges), (*Diffusion, Atmosphere), (*Atmosphere, Transport properties), Meteorological parameters, Air mass analysis, Data processing systems, Meteorological instruments, Micrometeorology, Climatology.

Field diffusion programs were conducted at Cape Canaveral, Florida, and Vandenberg Air Force Base, California, during 1961 and 1962. These programs were undertaken to establish quantitative diffusion predictions for use as range safety tools at the missile test ranges. The programs culminated at each range with the installation of an automatic computer-controlled meteorological data acquisition and processing system now in continuous operation at the bases. These systems have been named Weather Information Network Display (WIND) systems. Volume I (AD-428 436) of this report contains a description of the diffusion experiments which were conducted and summaries of the experimental data which were obtained. Volume II is devoted to analyses of the data to develop diffusion prediction equations, description of the WIND systems, recommendations for operational use of the prediction equation and WIND systems, and preliminary climatological summaries for each of the missile test ranges. (Author)

N65-24383 Field 16D, 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
EXPERIMENTAL AERODYNAMIC CHARACTERISTICS OF 10 SHORT AXISYMMETRIC BODIES AT MACH NUMBERS OF 5 TO 15,
by Gary T. Chapman, James E. Terry, and Scott Bruin.
May 65, 32p NASA-TN-D-2848
Unclassified report

Descriptors: (*Nose cones, Hypersonic characteristics), (*Axially symmetric flow, Aerodynamic configurations).

Patent 3,188,960 Field 16B

IMPACT SWITCH FOR MISSILE WARHEAD.
Patent assigned to Navy,
by Serge N. Samburoff. 15 Jun 65 Unclassified patent
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Electric switches, Impact shock), (*Firing circuits, Electric switches), (*Guided missile warheads, Electric detonators), Patents, Guided missiles, Reliability.

The dual contact switch is for the firing circuit of a missile warhead. The switch insures detonation of the warhead if one of the circuits becomes inoperative due to mechanical failure. It is responsive throughout a wide range of angles of impact and detonates upon impact on yielding surfaces such as the sea or soft earth.

PB-167 834 Field 16A, 21I, 21B
CFSTI Prices: HC$2.00 MF$0.50

Institute for Aerospace Studies, Univ. of Toronto (Ontario).
SHOCK AND COMBUSTION-WAVE DYNAMICS IN AN IMPLOSION-DRIVEN HYPERVELOCITY LAUNCHER,
by I. I. Glass. Jan 65, 45p UTIAS review no. 25
AD 457 981
Unclassified report

Descriptors: (*Guided missile launchers, Hypervelocity projectiles), (*Rocket launchers, Hypervelocity projectiles), (*Hypervelocity projectiles, Launching), Hypervelocity guns, Propellants, Explosives initiators, Explosive gases, Deflagration, Detonation waves, Shock waves, Propulsion, Interior ballistics, Models-(Simulations), Aerodynamic configurations, Atmosphere entry.

In order to solve many existing problems in planetary entry it is necessary to have facilities that are capable of launching undamaged projectiles at hypervelocities in excess of 50,000 ft/sec. Unfortunately, conventional light-gas guns appear to have reached a velocity plateau of about 30,000 ft/sec or less for launching integral aerodynamic models. It is shown that by a novel application of combustion-wave and shock-wave dynamics in gases and explosives that it is theoretically possible to achieve projectile velocities in the desired hypervelocity range. Some details are presented of the analysis, facility, and the research results obtained to date on spherical combustion of stoichiometric mixtures of oxygen and hydrogen diluted with helium or hydrogen, the initiation of propellants and explosives by using deflagration and detonation waves, and some initial launchings. (Author)

17. Navigation, Communications, Detection, and Countermeasures

N65-17119 Field 17G, 22C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
LINEAR ACCELERATION GUIDANCE SCHEME FOR LANDING AND LAUNCH TRAJECTORIES IN A VACUUM,
by Victor R. Bond. Feb 65, 18p NASA-TN-D-2684
Unclassified report

Descriptors: (*Space navigation, Terminal guidance), (*Launch vehicles(Aerospace), Space navigation), Acceleration.

N65-17266 Field 17H
CFSTI Prices: HC$3.00 MF:$0.75

American Science and Engineering, Inc., Cambridge, Mass.
AN X-RAY TELESCOPE,
by R. Giacconi, N. F. Harmon, R. F. Lacey, and Z. Szilagyi. Feb 65, 65p
Contract NAS5 660 Unclassified report
NASA CR-41
Descriptors: (*Telescopes, X-rays).

Patent 3,191,176 Field 17G, 22B

METHOD OF NAVIGATION.
Patent assigned to Navy,
by William H. Guier. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Navigation satellites, Naval operations), (*Radio navigation, Navigation satellites), Communication equipment, Airborne, Shipborne, Navigation computers, Systems engineering, Patents.

The system of ship navigation utilizes an artificially established earth satellite as a reference for determining the location of an observer in terms of latitude and longitude. The system includes communication equipment on the satellite and ship and a computer center.

PB-167 867 Field 17I
CFSTI Prices: HC$2.00 MF$0.50

Purdue Univ., Lafayette, Ind. Center of Applied Stochastics.
ON PROCESSING THE RADAR RETURN FROM AN IONIZED TRAIL.
Rept. no. 5, ser. 1,
by Will Gersch. 1964, 28p
Unclassified report

Prepared in cooperation with Columbia Univ., New York. Electronics Research Labs. Contract AF49 638 1113.

Descriptors: (*Atmosphere entry, Radar tracking), (*Radar tracking, Atmosphere entry), Reentry vehicles, Trajectories, Ionization, Radar targets, Mathematical models, Stochastic processes, Data processing systems, Computers.

The radar target model that is the ionized trail of an atmospheric reentry vehicle is considered as a channel or filter between the radar transmitter and receiver. The objective of the radar and its associated data processor is to 'map' or identify the radar target channel. The target is identified as the equivalent of a spatially distributed time-varying filter or equivalently as a range and velocity distributed target. The techniques for processing the radar return from both deterministic and stochastic versions of the target model include the matched filter and a generalized correlation computer. Results of the processor output are given in terms of the transmitted signal ambiguity function and a quantity called the target scatter cross-section. In general, and as expected, long time duration and large signal bandwidth transmitted signals are required in relation to the reciprocal target velocity spread and the reciprocal target range spread for accurate target model mapping. An exception is noted in the existence of an upper limit to the signal bandwidth that is useful in unambiguously mapping the stochastic target model. Alternatively, this result implies that there is a limit to the range resolution with which the range-velocity distributed stochastic targets can be observed. (Author)

PB-167 977 Field 17B, 5B
CFSTI Prices: HC$3.00 MF$0.75

Houston Research Inst., Inc., Tex.
FACSIMILE TRANSMITTAL OF TECHNICAL INFORMATION.
31 May 65, 68p
Unclassified report

Sponsored by National Science Foundation. Available copy will not permit fully legible reproduction.

Descriptors: (*Information retrieval, Facsimile transmission), (*Facsimile transmission, Information retrieval), Communication systems, Oils, Gases, Pipes, Radio communication systems, Facsimile communication systems, Feasibility studies.

A study is conducted of the feasibility of transmitting technical information by facsimile over existing communications networks, including oil and gas pipeline networks, between Houston and the major centers of technical information in the United States. Of the major communication networks evaluated, three offer potential for the nation-wide exchange of technical information: Oil and gas pipeline networks, NASA Mission Control Circuits, and Military Amateur Radio Service (MARS). No major technical or legal problems were encountered. The economics of facsimile transmittal were found to be strongly dependent upon other facets of the overall library exchange process, including volume, speed of retrieval and other factors. The interrelationship of these factors and their bearings on facsimile transmittal costs are discussed in this report. It is concluded that the establishment of a facsimile transmittal system is not justified until after major improvements have been made in present library procedures for information storage and retrieval. (Author)

18. Nuclear Science and Technology

AD-282 149 Field 18F, 11I
CFSTI Prices: HC$5.00

Monsanto Research Corp., Dayton, Ohio.
DEVELOPMENT OF A LIGHTWEIGHT PLASTIC NEUTRON SHIELDING MATERIAL BASED UPON BORON COMPOUNDS WITH HIGH HYDROGEN CONTENT.
Summary rept.,
by W. H. Yanko, M. E. Ginn, J. L. Schwendeman, L. Yoder, and D. J. Kaufmann. 3 Apr 62, 174p
Rept. no. MRC-62-4501-7A
Contract DA19 020ORD5458, Projs. 5510 12 285, 548 03 003 Unclassified report

Descriptors: (*Shielding, Materials), (*Plastics, Shielding), (*Boron compounds, Shielding), (*Neutron cross sections, Boron compounds), Polyethylene plastics, Hydrogen, Density, Neutron capture gamma rays, Melting, Stability, Toxicity, Atomic properties, Programming(Computers), Costs.

All known boron compounds, composed of elements of atomic numbers 1 through 20, were evaluated for neutron shielding properties vs. high density polyethylene, containing 6% amorphous boron, by comparison of calculated neutron removal cross-sections and hydrogen densities. All boron compounds, derived from a comprehensive literature survey up to March 1961, were tabulated along with their pertinent properties: density, hydrogen density, microscopic and macroscopic neutron removal cross-sections, thermal neutron capture gamma-ray energies, melting point, stability and toxicity. A method for calculating densities by use of atomic volume summation corrected by derived factors was devised. A total of 129 unclassified compounds were found with hydrogen densities and neutron removal cross-sections higher than polyethylene 6% boron. Of these, 7 were selected as neutron shielding candidates. Cost estimates for these and 3 selected classified compounds were made for 50 and 500 lb. samples and at production rates of 2 and 4 million lb./yr. (Author)

AD-410 031 Field 18C, 15C
CFSTI Price: HC$2.00

Stanford Research Inst., Menlo Park, Calif.
IGNITION OF MATERIALS BY LARGE YIELD NUCLEAR WEAPONS FOR VARIOUS BURST HEIGHTS AND ATMOSPHERIC CONDITIONS.
Technical rept.,
by Jack C. Rogers. May 63, 31p
Contract OCD OS62 135, Proj. IMU4021
Unclassified report

Descriptors: (*Nuclear explosions, Thermal radiation), (*Ignition, Materials), Nuclear weapons, Atmospherics, Airburst, Cloud cover, High altitude, Nuclear explosion damage, Attenuation.

The purpose of this report is to summarize select-ed unclassified results derived from recently published information on thermal effects of nuclear detonations. The expected ranges are given for ignition of materials by megaton weapons under the assumption of an idealized, transparent atmosphere. From these similar results are developed for real atmospheres. The effects of altitude variation on ignition radii are explored, including surface and outer space bursts. Attenuation of clouds is considered as well as bursts below clouds and the influence of ground snow cover on the ignition ranges. Finally, recommended research, which would improve some of the estimates of ignition range, is outlined. (Author)

AD-433 633 Field 18D, 9A
CFSTI Price: HC$1.00

Naval Radiological Defense Lab., San Francisco, Calif.
PROTOTYPE OF A PORTABLE MICROCALORIMETER FOR MEASUREMENT OF ABSORBED DOSE,
by E. R. Schleiger and N. Goldstein. 6 Jan 64, 18p
USNRDL-TR-710
N64 18189
Unclassified report

Descriptors: (*Calorimeters, Radiation measurement systems), (*Radiation measurement systems, Calorimeters), Temperature sensitive elements, Absorption, Calibration, Thermistors, Dose rate, Sensitivity, Stability, Effectiveness.

A prototype of a compact, portable microcalorimeter was built which measures ionizing radiation dose rates as low as 3 aluminum rads/min. The absorber and temperature sensing system are similar to those described in USNRDL-TR-621, but the temperature controlled bath described therein has been replaced by an aluminum isothermal shield bolted to the bottom surface of a copper reservoir containing liquid nitrogen. Both the shield and the reservoir are contained in a vacuum chamber. Calibration of the absorber is accomplished by observing the respone of an imbedded thermistor when the calorimeter is placed in a gamma-ray field of known exposure level provided by a 200-curie Co60 source. Plans are presented for extending this method of temperature control to a smaller microcalorimeter (outside diameter 2.25 in.) which will increase the portability and minimize attenuation of the radiation field. (Author)

BRB-78 Field 18J
CFSTI Prices: HC$2.00 MF$0.50

Bridgeport Brass Co., Seymour, Conn.
QUARTERLY PROGRESS SUMMARY ON FUEL DEVELOPMENT, APRIL - JUNE 1963.
13 Dec 63, 30p
Contract AT(30-1)-1405
Unclassified report

Descriptors: (*Reactor fuels, Uranium), (*Uranium, Material forming).

CAPE-51 Field 18J, 7A

National Lead Co. of Ohio, Cincinnati.
GREEN SALT PLANT.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Uranium compounds, Fluorination), (*Fluorination, Uranium compounds), Oxides, Fluorides, Manufacturing methods, Processing, Production, Chemical engineering, Industrial plants, Design.

In the Green Salt Plant, uranium trioxide (UO3) is converted to uranium tetrafluoride (UF4), or green salt, by a two-step, continuous process. In the first step, UO3 is converted to uranium dioxide (UO2) by reduction with hydrogen. In the second step, UO2 is converted to UF4 in a reaction with anhydrous hydrogen fluoride. Hydrofluorination takes place in three horizontal screw-reactors arranged in a vertical stack. The hydrofluorination reactors are 16-in.-dia tubes about 22 ft in length. Each reactor is enclosed by electric furnaces. Powder is conveyed through the reactors by a lawn-mower type, variable-speed screw rotor equipped with special pusher blades to provide mixing and forward motion to the powder. The reactant gases in each system are kept separate by seal hoppers with the solids powder used as a sealant. Facilities are provided to pulverize, blend, and package the UF4 product. Includes 50 drawings. (AEC abstract)

CAPE-54 Field 18J, 7A

Union Carbide Corp., Paducah, Ky. Paducah Plant.
FLUORINATION PLANT FOR MANUFACTURE OF UF6.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Fluorination, Uranium), (*Uranium, Fluorination), Manufacturing methods, Chemical engineering, Jet pumps, Heat exchangers, Uranium compounds, Flourides, Production.

Uranium tetrafluoride (UF4) is converted to uranium hexafluoride (UF6) in a highly exothermic reaction, shown as follows: UF4(s) + F2(g) = UF6(g) + 112,000 BTU/lb. mole U. The UF6 production line consists generally of a vertical, water-cooled flame reactor, sintered metal filters, heat exchangers, a fluorine cleanup reactor and an ejector for inert gas removal. Gaseous UF6 is produced by treating UF4 with preheated F2 in the water-cooled flame reactor. The gas is filtered and chilled to a solid in a refrigerated heat exchanger. The solid is liquefied under pressure and drained into ten-ton product cylinders. This process lends itself to highly automated mass production techniques. Chemical efficiencies are high; the F2 efficiency is 99% and the uranium yield is greater than 99%. The product is 99.9% pure UF6. (For details, see TID-4100) (M.C.G.) (AEC abstract) Includes 59 drawings.

CAPE-870 Field 18J, 7A

Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
COLUMN LEACHER.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Uranium, Seperation), (*Distilling plants, Uranium), Chemical engineering, Uranium compounds, Oxides.

The column leacher described is used in the recovery of enriched uranium from powdered uranium oxides. It is used to dissolve continuously the uranium in equipment of completely safe geometry. Although critically safe, it is not as efficient as a large dissolver pot. Includes 1 drawing. (AEC abstract)

CAPE-1075 Field 18J, 18F

Lawrence Radiation Lab., Univ. of California, Livermore.
6 IN. LEAD CAVES.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Reactor fuel processing, Shielding), (*Shielding, Reactor fuel processing), Lead, Reactor shielding materials, Handling, Plutonium, Americium, Curium, Radiation monitors, Mechanical drawings, Containers, Remote control systems.

Heavily-shielded, remotely-operated caves used in processing radioactive reactor slugs containing gram quantities of plutonium, americium, and curium are described. The caves confine the kilocurie alpha activity, corrosive chemicals, and the gamma and beta activity. The cell is constructed of interlocking 6-in. thick lead blocks on the front face, while the side walls, ceiling, and rear walls are constructed of standard concrete. Castle manipulators equipped with air-tight booting are employed for mechanical manipulation. The enclosure or cell boxes are fabricated from mild steel and are corrosive proofed with baked phenolic resins. Plexiglass windows are used on the front of the boxes and a translucent panel is used in the rear of the boxes for viewing. The ventilation system provides one air change per minute of fresh, filtered air to each enclosure. Exhaust air is passed into high-efficiency refrigerated scrubbers followed by banks of high efficiency filters. Monitors sensitive to alpha, beta, and gamma activity monitor gases before they are exhausted into the stack. Includes 231 drawings. (AEC abstract)

CAPE-1173 Field 18D

Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
EMERGENCY AIR SAMPLER.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Radiation monitors, Air), (*Gas analysis, Radiation monitors), (*Air, Samplers), Gas filters, Blowers, Radioactivity, Radiation measurement systems.

The air sampler described consists of an annular impactor, assembly to hold filter papers, fan housing, 0.8-hp motor, and a muffler. The fan is driven by the motor and it draws air through the impactor over the filter paper on which radioactive particulates are deposited. When the paper is removed, the particulates can be counted for radioactivity. The equipment is 11 in. high and sets on a 0.25-in. thick Al base 12.37 in. long and 7.5 in. wide. Includes 2 drawings. (AEC abstract)

CAPE-1177 Field 18D

Lawrence Radiation Lab., Univ. of California, Livermore.
ATMOSPHERE SAMPLING ENCLOSURE.
Engineering Materials. Unclassified report

Price information available from CFSTI upon request.

Descriptors: (*Radiation monitors, Samplers), (*Atmosphere, Radiation measurement systems), (*Samplers, Storage), (*Storage, Samplers), Containers, Radiation measurement systems.

The enclosure described is used for storing equipment for atmospheric sampling. It is located on a base 20 x 20 x 8.5 in. high and is constructed of steel angles with an 11 gauge mild steel sheet top. The housing is 27.5 in. high, 20 in. sq, and is constructed of steel angles, which are covered with 22 gauge mild steel sheets. There are louvere on three sides of the enclosure. The top lid opens to 105 degrees and is fabricated of steel. Includes 7 drawings (AEC abstract)

CEND-513 Field 18J
CFSTI Prices: HC$4.00 MF$1.00

Combustion Engineering, Inc., Windsor, Conn. Nuclear Div.
ADVANCED BONUS CORE DEVELOPMENT PROGRAM.
Quarterly progress rept. no. 4, Aug-Nov 64,
by J. F. Gibbons, R. L. Lyerly, and W. A. Maxwell.
Dec 64, 145p
Contract AT(40-1)-3154

Unclassified report

Descriptors: (*Reactor cores, Reactor fuel elements), (*Reactor fuel elements, Reactor fuel cladding).

GA-4930 (pt. 1) Field 18J
CFSTI Prices: HC$2.00 MF$0.50

General Atomic, San Diego, Calif.
ADVANCED, GRAPHITE-MATRIX, DISPERSION-TYPE FUEL SYSTEMS.
Quarterly progress rept. for the period ending 31 Dec 63,
by J. C. Bekros, W. V. Goeddel, J. R. Hooker, and L. R. Zumwalt. 15 Jan 64, 33p
Contract AT(04-3)-167

Unclassified report

Descriptors: (*Reactor fuels, Diffusion), (*Graphite, Material forming).

GA-5016 (pt. 1) Field 18J
CFSTI Prices: HC$3.00 MF$0.75

General Atomic, San Diego, Calif.
ADVANCED, GRAPHITE-MATRIX, DISPERSION TYPE FUEL SYSTEMS.
Annual rept., 1 Apr 63-3 Mar 64,
by J. C. Bokros, W. V. Goeddel, J. R. Hooker, and L. R. Zumwalt. 1964, 77p
Contract AT(04-3)-167

Unclassified report

Descriptors: (*Reactor fuels, Diffusion), (*Graphite, Material forming).

GA-5606 (pt. 1) Field 18J
CFSTI Prices: HC$2.00 MF$0.50

General Atomic, San Diego, Calif.
ADVANCED, GRAPHITE-MATRIX DISPERSION-TYPE FUEL SYSTEMS AND RESEARCH ON GRAPHITE.
Quarterly progress rept. for the period ending 14 Aug 64,
by J. C. Bokros, W. V. Goeddel, H. K. Lonsdale, and J. L. White. 1 Sep 64, 42p
Contract AT(04-3)-167 Unclassified drawing

Descriptors: (*Reactor fuels, Diffusion), (*Graphite, Material forming).

GEAP-3455 Field 18J, 21F
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM. FUEL ASSEMBLY TOP TIE PLATE LEAF SPRING TESTS,
by R. G. Cochran. 10 Jan 61, 19p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuel plates, Reactor cores), (*Nuclear-powered vessels, Design).

GEAP-3583 Field 18J, 21F
CFSTI Prices: HC$4.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM. FUEL ROD VIBRATION.
Final rept.,
by C. M. Shields. 1 Nov 60, 108p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuel rods, Vibration), (*Nuclear-powered vessels, Design).

HW-71589 Field 18G
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
LABORATORY STUDIES OF THE PRECIPITATION OF CERIUM SULFATE FOR OFF-SITE SHIPMENT,
by H. H. Van Tuyl. 1 Nov 61, 5p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Chemical precipitation, Cerium), (*Cerium, Transportation).

HW-76160 Field 18J, 9B
CFSTI Prices: HC$2.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
A TAPE PUNCH READOUT FOR THE 333 BUILDING FUEL ELEMENT MEASUREMENT FACILITY,
by G. E. Driver. 2 Jan 63, 31p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Reactor fuel elements, Digital computers), (*Punched tape, Reactor fuel elements).

HW-77027 Field 18L
CFSTI Prices: HC$3.00 MF$0.75

Hanford Atomic Products Operation, Richland, Wash.
N-REACTOR PRESSURIZER -- HIGH PRESSURE INJECTION PUMP SIMULATION STUDY PART I. EQUATIONS AND ANALOG CIRCUITS,
by R. K. Robinson. 16 Apr 63, 85p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Power reactors, Computers), (*Fuel injection, Simulation).

HW-78153 Field 18J
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
ALSI FUEL ENRICHMENT TESTER -- ERT-1,
by C. N. Jackson, Jr. 9 Jul 63, 16p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Reactor fuel enrichment, Test equipment(Electronics).

HW-78756 Field 18I
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
NUCLEAR PARAMETER SURVEY FOR SOME COMPACT, FAST-SPECTRUM, CERMET REACTORS,
by L. L. Maas and P. L. Hofmann. 20 Aug 63, 22p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Fast reactors, Nuclear engineering).

HW-80913 Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
PULSED NEUTRON SOURCE MEASUREMENTS OF THE Z-9 CRIB,
by S. R. Bierman. 17 Mar 64, 9p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Radiation measurement systems, Reactor safety systems).

HW-83181 Field 18G
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
DUMP TESTS FOR CHARGING NPR FUEL ELEMENTS INTO AN ANNULAR DISSOLVER,
comp. by M. Clement. 7 Jul 64, 5p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Reactor fuel elements, Solvent extraction), (*Solvent extraction, Reactor fuel elements.

N65-17115 Field 18D, 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
RADIATION MEASUREMENTS ON THE NINTH MERCURY-ATLAS MISSION (MA-9),
by Carlos S. Warren and Benny R. Baker. Feb 65, 28p NASA-TN-D-2608
Unclassified report

Descriptors: (*Radiation measurement systems, spacecraft), (*Spacecraft, Raidation measurement systems), Radiation damage, Radiation effects, Astronauts.

N65-19501 Field 18E, 1D, 22C, 19G, 18L
CFSTI Prices: HC$5.00 MF$1.25

Arizona Univ., Tucson.
RESEARCH IN AND APPLICATION OF MODERN AUTOMATIC CONTROL THEORY TO NUCLEAR ROCKET DYNAMICS AND CONTROL,
by Lynn E. Weaver, Donald G. Schultz, David L. Hetrick, James L. Melsa, and Phillip A. Secker.
Mar 65, 193p
Grant NsG490 Unclassified report
NASA CR-193
Descriptors: (*Control systems, Nuclear propulsion), (*Nuclear propulsion, Rockets), (*Rockets, Nuclear propulsion), Dynamics, Nuclear reactors, Optimization, Nonlinear systems, Stability.

N65-22358 Field 18J
CFSTI Prices: HC$4.00 MF$1.00

United Aircraft Corp., East Hartford, Conn.
THEORETICAL VISCOSITIES AND DIFFUSIVITIES IN HIGH-TEMPERATURE MIXTURES OF HYDROGEN AND URANIUM,
by S. B. Schneiderman. Apr 65, 131p
Contract NASw847 Unclassified report
NASA CR-213
Descriptors: (*Nuclear reactors, Mixtures), (*Uranium, Hydrogen), (*Hydrogen, Uranium), Viscosity, Diffusion, Reactor fuels.

ORNL-3649 (vol. 2, sec. 2.12) Field 18D
CFSTI Prces: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
SMOOTHED THERMOCOUPLE TABLES OF EXTENDED SIGNIFICANCE (ZERO C). VOLUME 2. SECTION 2.12. ALUMEL-CHROMEL CRYOGENIC THERMOCOUPLES,
by R. K. Adams and E. G. Davisson. Mar 65, 12p
N65-20157
Contract W-7405-ENG-26
Unclassified report

Descriptors: (*Thermocouples, Cryogenics), (*Tables, Numerical analysis).

ORNL-3649 (Vol 2 Sec 2.13) Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
Smoothed Thermocouple Tables of Extended Significance (Zero C). Volume 2. Section 2.13. Constantan (JN)-Iron (JP) Cryogenic Thermocouples,
by R. K. Adams, and E. G. Davisson. Mar 65, 12p
N65-20158
Contract W-7405-ENG-26
Unclassified report

Descriptors: (*Thermocouples, Cryogenics), (*Tables, Numerical analysis).

ORNL-3649 (vol. 2, sec 2.14) Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
SMOOTHED THERMOCOUPLE TABLES OF EXTENDED SIGNIFICANCE (ZERO C). VOLUME 2. SECTION 2.14. CONSTANTAN (YN)-IRON (YP) CRYOGENIC THERMOCOUPLES,
by R. K. Adams and E. G. Davisson. Mar 65, 12p
N65-20159
Contract W-7405-ENG-26
Unclassified report

Descriptors: (*Thermocouples, Cryogenics), (*Tables, Numerical analysis).

ORNL-3695 Field 18J
CFST Prces: HC$3.00 MF$0.75

Oak Ridge National Lab., Tenn.
Dissolution of High-density U02, PU02, and U02-PU02 Pellets in I Norganic Acids,
by Armando L. Uriarte, and Robert N. Rainey.
Apr 65, 82p
Contract W-7405-ENG-26

Unclassified report

Descriptors: (*Reactor fuel processing, Inorganic acids), (*Inorganic acids, Reactor fuel processing).

Patent 3,189,445 Field 18J, 11F

BINARY NICKEL BASE ALLOYS.
Patent assigned to AEC,
by Vincent P. Calkins, Earl S. Funston and James A. McGurty. 15 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Nickel alloys, Control rods), (*Control rods, Nickel alloys), Patents, Rare earth elements, Samarium, Europium, Gadolinium alloys, Oxidation, Heat-resistant metals + alloys, Nuclear reactors.

The nickel base alloy are useful for the manufacture of control elements to be employed in neutronic reactors. The binary alloy of nickel contains nickel and from 5 to 25 weight percent of a rare earth metal selected from the group consisting of samarium, europium, and gadolinium.

Patent 3,189,446 Field 18J, 11F

TERNARY NICKEL BASE ALLOYS.
Patent assigned to AEC,
by Vincent P. Calkins, Earl S. Funston and James A. McGurty. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D. C., 20231, $0.25

Descriptors: (*Nickel alloys, Control rods), (*Control rods, Nickel alloys), Patents, Chromium alloys, Rare earth elements, Samarium, Europium, Gadolinium alloys, Oxidation, Heat-resistant metals + alloys, Nuclear reactors.

The alloy is useful for the manufacture of control rods for neutronic reactors. The alloys have improved neutron absorption characteristics. A ternary nickel-chromium-samarium alloy is disclosed in which the weight ratio of nickel to chromium is 4:1 and the amount of samarium constitutes from 5 to 10 percent by weight.

Patent 3,189,666 Field 18J

METHOD OF PREPARING URANIUM DIOXIDE FUEL COMPACTS.
Patent assigned to AEC,
by Ralph P. Levey, Jr., and Paul E. Trent. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Uranium compounds, Dioxides), (*Reactor fuel processing, Sintering), Patents, Reactor fuel element, Powder metallurgy, Mixtures, Powders, Pellets.

Uranium dioxide in the form of sintered compacts is useful as fuel material for various types of nuclear reactors. The compacts are prepared by intimately mixing high-fired UO2 of low-sinterability with highly-sinterable UO2 at a proporton of 1 to 10 weight percent highly sinterable UO2, compressing the resulting mixture into compacts and sintering the compacts in a reducing atmosphere.

PB-167 915 Field 18M
CFSTI Price: HC$1.00

Commissariat a l'Energie Atomique, Saclay (France). Centre d' Etudes Nucleaires.
RADIOPROTECTION PROBLEMS RESULTING FROM THE PRESENCE OF EXPERIMENTAL DEVICES AROUND AN ATOMIC REACTOR (Problems de Radioprotection Poses Par l'Implantation de Dispositifs Experimentaux Aupres d'une Pile Atomique),
by Lucien Fitoussi and Philippe Lebouleux. Apr 65, 19p Rept. no. CEA-R-2799

Unclassified report

Attached summary in English, text in French.

Descriptors: (*Reactor hazards, Reactor operation), (*Radiation hazards, Reactor hazards), Nuclear reactors, Reactor safety systems, Reactor accidents, Control, Test methods, Safety, Research reactors, France.

The setting up of experimental devices around a reactor produces dangers of irradiation and radio-active contamination which can become very great in the case of an accident, especially if the in-pile portion contains fissile matter. This may result in irradiation of personnel, prohibition of access to the experimental zones until the sources of irradiation and contamination have been eliminated, and a prolonged stoppage of the reactor. The plans for an in-pile experiment should take into account radio-protection factors; the aim of these is to reduce to a minimum the radio-active risks normally encountered during the experiment and to eliminate any risks of bad accidents and their consequences. In this report are classified the various types of experiments requiring installations outside the pile itself; for each of these experiments the particular radioprotection factors are given. In order to make possible a study of the radio-active dangers likely to arise during a projected experiment, the authors summarize the physical and technical data required by radio-protection specialists and give the rules and general advice concerning radio-protection which should be useful during the planning of an in-pile experiment and the setting-up of the equipment.

PB-167 919 Field 18K
CFSTI Prices: HC$4.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ALECTO II: INTERACTION STUDIES (ALECTO II: Etudes d'Interaction),
by Jean-Paul Brunet, Christian Clouet d'Orval, Jean-Claude Mougniot, and Francois Penet. Jan 65, 106p CEA-R-2561

Unclassified report

Document in French, attached summary in English.

Descriptors: (*Nuclear reactors, Critical assemblies), (*Critical assemblies, Neutron reactions), (*Neutron reactions, Critical assemblies), Uranium, Solutions, Shielding, Reactor reactivity, Reactor reflectors, Reactor control, Mathematical models, France.

Weak interactions were experimentally studied with the tank of the critical assembly Alecto II and one, two, or three bottles containing solutions of various concentrations. Particular attention was given to the validity of certain classical assumptions, shielding effects, screening and semi-reflection effects, and thermal coupling. The method of the 'k sub eff, solid angle' is shown to apply to such a system. The determination of reactivity related to a mm of solution by divergence and pulsed neutron techniques permits the determination of critical heights in terms of reactivity. (Author)

PB-167 925 Field 18H, 18D
CFSTI Prices: HC$4.00 MF$1.00

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CALIBRATED RADIO-ACTIVE SOURCES: ABSOLUTE MEASUREMENTS USING A 4 PI BETA - GAMMA APPARATUS (Sources Etalons de Radioactivite: Mesures Absolues au Moyen d'un Ensemble 4 pi beta - gamma),
by Paulette Benoit and Claude Philis. Mar 65, 123p
CEA-R-2711
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Radioactive isotopes, Calibration), Coincidence counting, Beta decay, Gamma counters.

The principle of the standardization of the radioisotopes by the 4 pi beta-gamma coincidence method is recalled. Some theoretical examples are given emphasizing on instrumental coincidences and their corrections. The experimental apparatus is described: The choice of the experimental conditions for the many isotopes measured is discussed. Results are given and discussed. (Author)

PB-167 926 Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
APPLICATION OF A PROPORTIONAL COUNTER TO SOME PARTICULAR CASES OF ALPHA MEASUREMENTS (Applications d'un Compteur Proportionnel a Quelques Cas Particuliers de Mesures alpha),
by Janine Ferret, Marie-Therese Gasc, and Rene le Du. Mar 65, 25p CEA-R-2765
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Alpha decay, Proportional counters), (*Proportional counters, Alpha decay), Coincidence counters, Alpha counters, Americium.

A measurement method based on alpha-gamma coincidences is used for activity measurements on 241 Am in the presence of a strong alpha activity due to Pu. The sensitivity of the apparatus makes it possible to detect: less than 10 to the -7th power micro C 241 Am in the presence of alpha Pu activities several hundred times greater. The same equipment has been used for a measurements on alpha-emitting sources in the presence of very strong beta and gamma activities. In particular results are given for alpha-activity measurements on powder samples. It is evan possible in these conditions to detect or measure 241 Am. The equipment makes possible also: the absolute calibration of a pure 241 Am source; 237 Np measurements; simultaneous measurements of alpha, beta and gamma activities in solid samples in various forms.

PB-167 956 Field 18K
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Cadarache (France). Centre d'Etudes Nucleaires.
UTILIZATION OF THE RAPSODIE REACTOR FOR THE MEASUREMENT OF THE DOPPLER COEFFICIENT OF FAST POWER REACTORS (Utilisation du Reacteur Rapsodie pour la Mesure du Coefficient Doppler des Piles Rapides de Puissance),
by Casimir Pierre Zaleski, Rene Abson, Jean Ladet, Isidore Puig, and Lesli Stevens. Jun 64, 43p
CEA-R-2565 Unclassified report
EUR 2233 f
Text in French with attached summary in English. Available copy will not permit fully legible reproduction. English trans. of this rept. without annex is available from CFSTI $9.00, in ANL-6792, Proceedings of Conference in Breeding, Economics and Safety in Large Fast Breeder Reacter, Argonne National Laboratory, October, 1963, p853-72.

Descriptors: (*Fast reactors, Doppler effect), (*Doppler effect, Fast reactors), (*Power reactors, Doppler effect), Neutron reactions, Breeder reactors, Reactor operation, Reactor reactivity, Neutron flux, Reactor fuels, Isotopes, Uranium, Plutonium.

Two methods for measuring the Doppler coefficient in large fast power reactors using PuO2-UO2 fuel elements are outlined. Measurements are to be performed on a 400-liter core placed in Rapsodie.

PB-167 961 Field 18I, 5A
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
THE IDEAL ATOMIC ENTRE (Le Centre Atomique Ideal),
by Roland Mas. Mar 65, 76p Rept. no. CEA-R-2754
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Nuclear reactors, Research program administration), (*Research program administration, Nuclear reactors), Nuclear engineering, Reactor system components, Buildings, Site selection, Foundations-(Structures), Employee relations, Management engineering, Scientific personnel, France.

Problems facing those who have to design, construct, and operate a nuclear research center are reviewed. Ground plan, infrastructure, buildings and large units of scientific equipment, maintenance, production, supplies, and security are discussed. The relationship between the research workers and the management is stressed. The creation of a National School for Administration in Research to train administrative executives for public or private organizations is proposed.

PB-167 964 Field 18K, 9A
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
SPECIFICATIONS FOR A NEUTRON SCATTERING CODE FOR AN XY GEOMETRY: DAIXY (Specification d'un Code de Diffusion en Geometrie XY: DAIXY),
by Chantal Vasseur, Robert Bruyere, Andre Guillou, and Paul Quilichini. Feb 65, 27p Rept. no. CEA-R-2759
Unclassified report

Text in French, attached summary in English
Available copy will not permit fully legible reproduction.

Descriptors: (*Neutron scattering, Difference equations), (*Programming(Computers), Neutron scattering), Iterative methods, Geometry.

This report describes the specifications of the DAIXY program which resolves the difference equations system analogue to the homogeneous problem of multigroup neutron scattering, in a two-dimensional space with XY geometry. The maximum number of points treated is 10,050. The number of groups must be less than 4. The internal iterations are dealt with by the alternating directions method; the external iterations are accelerated by the extrapolation method due to Tchebychev. (Author)

PB-168 001 Field 18K, 12A
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
MONTE-CARLO METHOD FOR STUDYING THE SLOWING DOWN OF NEUTRONS IN A THIN PLATE OF HYDROGENATED MATTER (Methode de Monte-Carlo pour l'Etude du Ralentssement des Neutrons dans une Plaque Mince de Matiere Hydrogenee),
by Pierre Ribon and Andre Michaudon. Jun 65, 33p
Rept. no. CEA-R-2804 Unclassified report
Text in French, attached summary in English.

Descriptors: (*Neutron absorption, Monte Carlo method), (*Monte Carlo method, Neutron absorption), Neutron age, Thermal neutrons, Neutron absorption, Hydrogenation, France.
The studies of slow neutrons interaction with atomic nuclei by means of the time of flight methods are made with a pulsed neutron source with a broad energy spectrum. The measurements accuracy needs a high intensity and an as short as possible and well defined output time of the neutrons. If the neutron source is a target bombarded by the beam of a pulsed accelerator, it is usually required necessary to slow down the neutrons to obtain a sufficient intensity at low energies. The purpose of the Monte-Carlo method which is described n this paper is to study the slowing down properties, mainly the intensity and the output time distribution of the slowed down neutrons. The choice of the method and parameters studied is explained as well as the principles, some calculations and the program organization. (Author)

PB-168 005 Field 18H, 18D
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
MEASUREMENT OF THE FISSION CROSS-SECTION OF 235U AND 239Pu FOR THERMAL NEUTRONS (Mesures de Sections de Fission de 235U et de 239Pu en Neutrons Thermiques),
by Georges Fraysse, Armando Prosdocimi, Francis Netter, and Claude Samour. Apr 65, 92p
Rept. no. CEA-R-2775
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Neutron cross sections, Thermal neutrons), (*Uranium, Neutron cross sections), (*Plutonium, Neutron cross sections), Fission neutrons, Neutron detectors.

Improved techniques of fast detection have been applied for determining the fission cross-sections of 235U and 239Pu with reference to the absorption cross-section of Boron. Monochromatic neutron beams of 0.0322 eV, 0.0626 eV and 0.275 eV have been employed. Use has been made of a Xe-filled gaseous scintillator and of a low-geometry solid state ion chamber. Both measured alpha and fission rates. The results at the reference energy of 0,0253 eV are: 235U = 588 ± 10 barns, 239Pu = 738 ± 7 barns. (Author)

RMI-1 Field 18J, 13H
CFSTI Prices: HC$1.00 MF$0.50

Reactive Metals, Inc., Ashtabula, Ohio.
QUARTERLY PROGRESS SUMMARY, APRIL-JUNE 1964.
11 Nov 64, 20p
Contract AT(30-1)-1405
Unclassified report

Descriptors: (*Uranium, Extrusion), (*Reactor fuel elements, Uranium).

TID-7022 (vol. 1 - bk. 2) Field 18J
CFSTI Prices: HC$3.50 MF$1.50

National Lead Co. of Ohio, Cincinnati. Analytical Dept.
ANALYTICAL CHEMISTRY MANUAL OF THE FEED MATERIALS PRODUCTION CENTER. GENERAL ANALYTICAL METHODS: INSOLUBLE SOLIDS THROUGH ZIRCONIUM.
Dec 64, 338p
Contract AT(30-1)-1156
Unclassified report

Descriptors: (*Nuclear physics laboratories, Chemical analysis).

TID-21280 Field 18E
CFSTI Prices: HC$2.00 MF$0.50

Societe d'Energie Nucleaire Franco-Belge des Ardennes, Chooz-lez-Givet (France).
ARDENNES NUCLEAR POWER PLANT.
Quarterly rept. no. 8, 1 Apr-30 Jun 64.
7 Aug 64, 34p Unclassified report

Descriptors: (*Nuclear power plants, Construction).

UCRL-7445 Field 18J
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
MEASUREMENTS OF THERMALLY INDUCED STRESS WAVES IN A THIN ROD USING BIREFRINGENT COATINGS,
by A. L. Austin. 7 Jan 64, 43p Unclassified report
Contract W-7405-ENG-48

Descriptors: (*Structural parts, Stresses), (*Thermal stresses, Structural parts).

UCRL-7608 Field 18C, 8I
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
A MINING EXPERIMENT IN GRANITE,
by Dave Rabb. 2 Dec 63, 23p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Granite, Mining engineering), (*Mining engineering, Nuclear explosions).

UCRL-7641 Field 18J
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
LOSS-OF-WATER EXPERIMENT AT THE LIVERMORE POOL TYPE REACTOR,
by M. Knezevich, R. L. Kathren, and O. K. Helferich.
8 Jan 64, 14p
Contract W-7405-ENG-48

Unclassified report

Descriptors: (*Light water reactors, Reactor materials), (*Reactor accidents, Light water reactors).

UCRL-7666 Field 18K
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore,
OPTICAL MODEL ANALYSIS OF THE SCATTERING OF PROTONS BY MAGNESIUM,
by H. F. Lutz, and J. B. Mason. 22 Jan 64, 15p
Contract W-7405-ENG-48

Unclassified report

Descriptors: (*Proton scattering, Magnesium).

UCRL-7670 Field 18B
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Raidation Lab., Univ. of California, Livermore.
THE SCATTERING OF 12.0-MEV DEUTERONS BY THE SEPARATED ISOTOPES OF SILVER,
by H. F. Lutz, S. F. Eccles, and J. B. Mason.
23 Jan 64, 17p
Contract W-7405-ENG-48

Unclassified report

Descriptors: (*Deuterons, Scattering), (*Isotope separation, Silver).

UCRL-7686 Field 18J, 18I
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
A STUDY OF BERYLLIUM OXIDE MODERATED CRITICAL ASSEMBLIES CONTAINING VARIOUS METAL ABSORBERS,
by John R. Morton, III, James M. Piowaty, and Joseph Petruzzi. 5 Feb 64, 19p
Contract W-7405-ENG-48

Unclassified report

Descriptors: (*Critical assemblies, Reactor moderators), (*Beryllium compounds, Oxides),

UCRL-11135 Field 18K
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
SEMICLASSICAL ANALYSIS OF WEAKLY INELASTIC MOLECULAR COLLISIONS,
by M. Child. Nov 63, 23p
Contract W-7405-ENG-48

Unclassified report

Descriptors: (*Inelastic scattering, Perturbation theory), (*Electron transitions, Inelastic scattering).

WCAP-6062 Field 18F, 18H
CFSTI Prices: HC$5.00 MF$1.00

Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
EXPERIENCE IN THE SHIPMENT OF YANKEE FUEL ASSEMBLIES FOR POST-IRRADIATION EXAMINATION,
by B. James, D. D. Payne and H. E. Walchli
Feb 65, 160p
Contract AT(30-1)-3017

Unclassified report

Descriptors: (*Reactor fuel elements, Transportation), (*Power reactors, Reactor fuel elements).

19. Ordnance

AD-439 301 Field 19D
CFSTI Price: HC$1.00

Bureau of Mines, Pittsburgh, Pa. Explosives Research Center.
HYPERVELOCITY IMPACT PHENOMENA.
Quarterly rept. for 1 Dec 63-29 Feb 64,
by Richard W. Watson, Karl R. Becker, and Frank C. Gibson. 16 Apr 64, 25p
ARPA Order 149

Unclassified report

Descriptors: (*Hypervelocity projectiles, Terminal ballistics), Aluminum, Shock waves, Metals, Targets, Transducers, Pressure, Test methods, Test equipment, Acrylic resins, Penetration, Polyethylene plastics, Sheets, Laminated plastics, Phenolic plastics, Nylon, Glass textiles, Radiography, Plastics, Foams, Oscillographs, Resistance(Electrical), Cameras, Photographs, Propagation.

The work performed was devoted primarily to developing techniques applicable to study of the transmission characteristics of shock waves generated by the impact of hyper-velocity projectiles on both metallic and non-metallic targets. As a result, an electronic technique, based on an expendable resistive pressure transducer, has been developed and is currently being applied to impact studies in a variety of target materials. A phase of this investigation revealed certain deficiencies in the 9.3 km/sec inhibited jet projector system; a technique has been applied to eliminate one of the difficulties.0

AD-446 788 Field 19D, 1A, 20D
CFSTI Price: HC$1.00

GM Defense Research Labs., Santa Barbara, Calif.
A SOLUTION FOR THE INERTIAL ENERGY SPECTRUM OF ISOTROPIC TURBULENCE.
Technical rept.
by Alan Q. Eschenroeder. Aug 64, 20p
Rept. no. TR-64-02F
Contract DA04 495ORD3567Z, ARPA Order No. 357-63
N65 17922; N64 30528

Unclassified report

Hypervelocity Range Research Program, A part of Project 'Defender'.

Descriptors: (*Turbulence, Statistical analysis), (*Hypervelocity projectiles, Fluid dynamic properties), Hypersonic flight, Reynolds number, Energy, Functions, Transformations(Mathematics), Fluid mechanics, Exterior ballistics.

A dynamic equation for quasi-stationary, inertially dominated, isotropic turbulence is formulated on the basis of a modified Obukhoff transfer term. By means of an elementary transformation, a self-similar solution for the energy spectrum is obtained. The closed-form expression for an inertial range in the quasi-equilibrium regime obeys previously derived functional laws for large and small wave numbers. Matching the analytical result with an experimentally determined coefficient in the large-wave-number limit gives consistent scaling of terms over the energy-containing eddy range of the spectrum. (Author)

N65-18505 Field 19G, 1A
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EFFECT OF FIRST-STAGE GEOMETRY ON AERODYNAMIC CHARACTERISTICS IN PITCH OF TWO-STAGE ROCKET VEHICLES FROM MACH 1.57 TO 2.86,
by William A. Corlett and Celia S. Richardson.
Mar 65, 98p NASA-TN-D-2709
Unclassified report

Descriptors: (*Rockets, Aerodynamic characteristics), (*Aerodynamic characteristics, Geometry), Staging, Pitch(Motion).

N65-19282 Field 19G, 21C, 21H
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
RESULTS FROM SERT I ION ROCKET FLIGHT TEST,
by Ronald J. Cybulski, Daniel M. Shellhammer, Robert R. Lovell, Edward J. Domino, and Joseph T. Kotnik. Mar 65, 41p NASA-TN-D-2718
Unclassified report

Descriptors: (*Rockets, Flight testing), (*Ion engines, Rockets), Ion beams, Rocket propulsion.

N65-20485 Field 19D, 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ANALYSIS OF HYPERVELOCITY PERFORATION OF A VISCO-PLASTIC SOLID INCLUDING THE EFFECTS OF TARGET-MATERIAL YIELD STRENGTH,
by Robert G. Thomson. Apr 65, 39p NASA-TR-R-221
Unclassified report

Descriptors: (*Hypervelocity projectiles, Penetration), (*Metal plates, Penetration).

Patent 3,188,953 Field 19B

ARMING DEVICE FOR A FIRE BOMB FUZE.
Patent assigned to Navy,
by Renato Bianchi, Albert S. Will, and Norman C. Butler. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Arming devices, Bomb fuzes), (*Fire bombs, Arming devices), (*Bomb fuzes, Arming devices), Aircraft, Flight, Circuits, Patents.

The fusing arrangement is for a fire bomb which is dropped from an aircraft in flight. The arrangement includes safety features and interlocks in the bomb, including a fuse constructed in such a manner that the electrical circuitry contained in it has a neutral or grounded potential when the component parts are assembled and interconnected.

Patent 3,188,954 Field 19B, 15B

GAS EJECTION BOMB FOR DISPERSING SOLID PARTICULATES.
Patent assigned to Army,
by Paul G. Roach and Harold C. Weingartner.
15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Chemical bombs, Bomb ejectors), (*Bomb ejectors, Chemical bombs), Toxicity, Solids, Airborne, Patents.

The gas ejection bomb is so constructed that finely divided toxic solids are dispersed upon impact with the ground or a solid object. The toxic powder is dispersed into the air in the form of a low hanging cloud. A tank of carbon dioxide is housed in the bomb. The released gas pressure is used to disperse the gas past the tail orifices.

Patent 3,188,958 Field 19E, 16D

RANGE CONTROL FOR A BALLISTIC MISSILE.
Patent assigned to Army,
by James D. Burke, Robert J. Parks, and Robert M. Stewart. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Guided missiles(Surface-to-surface), Preset guidance), (*Ranges(Distance), Guided missiles-(Surface-to-surface), Guided missile computers, Drag, Inertial guidance, Patents.

The dragbrake range control system is for surface-to-surface missiles. The system includes a single mechanism having four paddle-like brake members which open and close for a coarse and fine braking period. During the coarse brake period the brakes are opened in response to a pre-set timing mechanism and are closed by a signal from a coarse brake closing computer. During the fine brake period the brakes are opened by a signal from a fine brake opening computer and closed by a signal from a fine brake closing computer.

Patent 3,190,023 Field 19F

MULTIMAGAZINE, TWO-STAGE FEEDING DEVICE FOR FIREARMS.
Patent assigned to Army,
by Frederick P. Reed. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Feed mechanisms, Small arms), (*Small arms, Feed mechanisms), Gun components, Multiple operation, Patents.

The rifle is provided with a feed mechanism which provides a supply of cartridges from two similar box-type magazines arranged so that one is automatically positioned for feeding when the other is depleted, and the emptied magazine is automatically ejected. The magazines are mounted side-by-side and are indexed transversely.

Patent 3,190,221 Field 19G

ROCKET STAGE COUPLING.
Patent assigned to Navy,
by John M. Gariboldi. 22 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Couplings, Rocket components), (*Booster motors, Couplings), Separation, Guided missiles(Air-to-air), Patents, Sounding rockets, Fins, Rockets.

The coupling is for joining a pair of rocket stages together so that a first stage can be fired with the stages in tandem and then the second stage fired causing the separation of the second stage from the first stage. The coupling is utilized on the 2.75 inch FFAR or folding fin air rocket which is used for air-to-air purposes. Several of these rockets are coupled to provide more booster force for deeper probes into space.

Patent 3,191,317 Field 19C, 5I

TANK TURRET TRAINER.
Patent assigned to Navy,
by Alfred M. Davock and Dana C. Manning. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Tank turrets, Training devices), (*Training devices, Range finding), (*Range finding, Training devices), Simulators, Military training, Patents.

The rangefinder simulator is used to train a student to operate a gun in the turret of a military tank. A static display containing a target is projected onto a screen at an undisclosed range and the distance from the subject to the target is varied in accordance with range data. The apparatus includes an instructor's console.

Patent 3,191,429 Field 19H, 13J

WEIGHT AND BALANCE EQUIPMENT.
Patent assigned to Navy,
by Carroll C. Smith. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Ballast, Underwater ordnance), (*Stabilization systems, Underwater ordnance), (*Underwater ordnance, Stabilization systems), Suspension devices, Torque couplings, Servomechanisms, Patents.

The apparatus is for use in ballasting individual sections of mine vehicles and torpedoes for righting moment. The body to be ballasted for righting moment is suspended in an annular sling at one or both ends and a constant torque is applied to the body regardless of the degree of rotation thereof from the initial zero roll position.

Patent 3,192,412 Field 19A

ARMING ACCELEROMETER.
Patent assigned to Army,
by Merrick W. Stewart and Roger K. Smith.
29 Jun 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Accelerometers, Arming devices), (*Arming devices, Accelerometers), Projectiles, Patents.

The arming device is for arming a moving vehicle such as a projectile. It utilizes the basic features of an accelerometer, a time delay switch and a velocity meter. The accelerometer is a component of the velocity meter and independently serves to start or stop operation of the velocity meter.

PB-167 706 Field 19A
CFSTI Prices: HC$3.00 MF$0.75

Army Materiel Command, Washington, D. C.
MILITARY PYROTECHNICS SERIES. PART II. SAFETY, PROCEDURES AND GLOSSARY.
Engineering design handbook. Unclassified report
Oct 63, 65p AMCP-706-186
Report on Research and Development of Materiel.

Descriptors: (*Pyrotechnics, Handbooks), Safety, Toxicity, Sensitivity, Heat, Moisture, Electrostatics, Ignition, Processing, Particle size, Hazards, Transportation, Storage, Handling, Measurement, Hygrometers, Manometers, Adsorption, Sampling.

The handbook constitutes Part Two of a planned series on Military Pyrotechnics and forms part of the Engineering Design Handbook Series of the Army Materiel Command. Part Two deals with the problems of safety in the pyrotechnics laboratory and plant, processing procedures and equipment, particle size procedures, and contains a glossary of terms.

PB-167 783 Field 19D
CFSTI Prices: HC$8.90 MF$.275

Armour Research Foundation, Chicago, Ill.
PROCEEDINGS OF SYMPOSIUM ON HYPERVELOCITY IMPACT (3rd), VOLUME I, HELD 7-9 OCTOBER 1958, CHICAGO,
ed. by F. Genevese. Feb 1959, 591p
Contract DA11 022 509ORD2721 Unclassified report
AD 233 487

Descriptors: (*Hypervelocity projectiles, Terminal ballistics), (*Symposia, Terminal ballistics), (*Terminal ballistics, Hypervelocity projectiles), Cratering, Penetration, Impact shock, Hypervelocity guns, Aerodynamic heating, Light gas guns, Test equipment, Electrostatic accelerators.

20. Physics

AD-271 879 Field 20F
CFSTI Prices: HC$1.00

Air Force Cambridge Research Labs., Bedford, Mass.
THE CARBON VAPOR LAMP: A THERMAL RADIATION SOURCE FOR IMAGE FURNACES,

by G. P. Ploetz, H. F. Cox, and L. C. Larsen.
Sep 61, 22p AFCRL-764
Proj. 4619, Task 46190

Unclassified report

Available copy will not permit fully legible reproduction. Original document contains color other than black and white and is available in limited supply. After present stock is exhausted, it will be available in black and white only.

Descriptors: (*Carbon arc lamps, Thermal radiation), (*Laboratory furnaces, Carbon arc lamps), Sources, Optical images, Vacuum apparatus, Carbon, Vapors, Electrodes, Performance(Engineering), Plasma medium.

The report gives a description of the carbon vapor lamp, inclusive of experiments performed for improvement of the high-intensity carbon arc as a thermal radiation source. Potential improvements in the latter are cited in order of importance: (1) stability, (2) control, and (3) simplicity. The carbon electrode consumption is greatly reduced by operation in a partial vacuum. Use of a-c power results in the elimination of the d-c power rectifier. Photographs of the three-phase a-c carbon vapor lamp are shown. (Author)

AD-281 575 Field 20H, 20J
CFSTI Prices: HC$1.00

Institute of Theoretical Physics, Stanford Univ., Calif.
TRIDENT PRODUCTION CROSS SECTION AND QUANTUM ELECTRODYNAMICS AT SMALL DISTANCES,
by Mao-chao Chen. Apr 62, 16p
Technical note no. TN-55
Contract AF49 638 388, Proj. 9750 37500
AFOSR 2434; N62 11659

Unclassified report

Descriptors: (*Pair production, Quantum mechanics), (*Field theory, Pair production), Proton reactions, Electrons, Positrons, S-matrix, Relativity theory.

The cross section was calculated for the coincidence experiment of electron-positron pair production from electron-proton collision as a test of quantum electrodynamics at small distances. The electrons and positrons are considered highly relativistic and the protons are considered as Coulomb field sources; otherwise the calculations are exact to the fourth order of the matrix element. Distances probed are about 0.5 f. (Author)

AD-424 690 Field 20E, 14B
CFSTI Price: HC$1.00

David Sarnoff Research Center, Princeton, N. J.
MICROWAVE AND OPTICAL MASERS FOR MM WAVES.
Quarterly rept. no. 3, 1 May-31 Jul 63,
by C. H. Anderson, Z. J. Kiss, and H. R. Lewis.
31 Jul 63, 17p
Contract DA36 039AMC00082E

Unclassified report

Descriptors: (*Lasers, Infrared radiation), (*Infrared radiation, Lasers), (*Gases, Lasers), Infrared spectroscopy, Interferometers, Xenon, Helium, Infrared windows, Silicon, Pumping(Electronics), Microwave spectroscopy, Masers, Millimeter waves.

Instrumentation for the study of possible far-infrared (5 microns - 1000 microns) coherent radiation generators was continued. The vacuum housing of a Michelson far-infrared interferometer spectrometer is near completion. The construction of far-infrared gas maser cells was completed, and maser action was observed in rf-excited xenon-helium mixtures at 3.36 microns, 3.51 microns, and 3.68 microns. Initial experiments were carried out to observe optically pumped microwave maser operation between Zeeman levels of the CaF2:Dy2+ system. (Author)

AD-441 224 Field 20B
CFSTI Price: HC$2.00

Airtron, Inc., Morris Plains, N. J.
HYDROTHERMAL GROWTH OF LARGE RUBY SINGLE CRYSTALS.
Interim engineering progress rept. for 1 Jan-31 Mar 64,
by Roch R. Monchamp and Richard C. Puttbach.
31 Mar 64, 40p Rept. no. R11-447
Contract AF33 657 10508, Proj. 8 132
ASD IR-8-132(IV)

Unclassified report

Descriptors: (*Crystal growth, Ruby), (*Ruby, Single crystals), Laboratory furnaces, Silver, Containers, Solubility, Pressure, Sapphires, Temperatures, Colors.

Minor changes have been made in the size of the silver can and in the baffle design which have yielded improved pressure balance and reproducibly constructed baffles. During the warm-up period, partial dissolution of larger seeds occurs, and smaller seeds are completely dissolved; after the warm-up, the seeds and certain pieces of nutrient grow. This growth on the nutrient nuggets as well as on seeds was observed even with a shallow overall gradient of 40 C. The growth on the seeds and nuggets has been uniform in color though flawed in the case of one run. (Author)

AD-449 237 Field 20A
CFSTI Price: HC$6.00

Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
PROCEEDINGS OF THE NATIONAL CONFERENCE ON ATMOSPHERIC ACOUSTIC PROPAGATION (2nd), 22-23 APRIL 1964, HELD AT EL PASO, TEXAS,
1964, 240p

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Acoustics, Atmosphere), (*Atmosphere, Acoustics), (*Mechanical waves, Propagation), Explosion effects, Grenades, Meteorological parameters, Acoustic equipment, Symposia.

Contents: Grenade explosions in the upper atmosphere; acoustical ray tracing; the effect of turbulent pressure correlation of multiport microphones; acoustic considerations concerning a device for the reduction of wind noise; solion transducers for application to atmospheric acoustic studies; low-frequency, low-noise microphone instrumentation; differential bellowsphone calibrator; radiative absorption of sound; wind influence upon acoustic focusing; atmospheric and terrain effects on acoustic propagation; the coupling of ionospheric and neutral atmospheric acoustic waves; classification of acoustic signals into a finite number of classes; and detection of acoustic signals using a digital correlator.

AD-450 341 Field 20N
CFSTI Price: HC$9.05

Army Electronics Labs., Fort Monmouth, N. J.

PROCEEDINGS OF THE ANNUAL SYMPOSIUM ON FREQUENCY CONTROL (18th), 4, 5, 6 MAY 1964 HELD AT SHELBURNE HOTEL, ATLANTIC CITY, N. J.
1964, 604p

Unclassified report

Descriptors: (*Symposia, Frequency stabilizers), (*Frequency, Control), Quartz resonators, Ultrasonic radiation, Piezoelectric crystals, Crystal filters, Electrodes, Vibration, Thickness, Aging(Materials), Crystal oscillators, Communication equipment, Molecular beams, Masers, Cesium, Circuits, Semiconductor devices, Temperature control, Synthesis.

Contents: Fundamental Studies; Quartz Crystal Development And Engineering; General Topics; Atomic And Molecular Frequency Control; and Circuits and Measurements.

CAPE-1188 Field 20G

Oak Ridge National Lab., Tenn.
TARGET APPARATUS FOR THE VAN DE GRAAFF ACCELERATOR/Q-1134/.
Engineering Materials.

Unclassified drawing

Price information available from CFSTI upon request.

Descriptors: (*Particle accelerator targets, Particle accelerators), Particle beams, Collimators, Particle accelerator components.

The target apparatus described includes scattering chambers; a nuclear multiple plate camera; a multiple foil positioner; a leveling table, target holder; and a beam collimator for one of the scattering chambers. Includes 48 drawings. (AEC abstracts)

EURAEC-1085 Field 20M
CFSTI Prices: HC$4.00 MF$1.00

Centro Informazioni Studi Esperienze, Milan (Italy).
HEAT TRANSFER CRISIS WITH STEAM-WATER MIXTURES.
Joint topical rept. (CAN-2 and CAN-3),
by S. Bertoletti, G. P. Gaspari, and C. Lombardi.
Sep 64, 144p CISE-R-99*
Contract 060-61-7-RDI

Unclassified report

Descriptors: (*Water, Heat transfer), (*Steam, Heat transfer), (*Heat transfer, Perturbation theory).

N65-16579 Field 20K, 11F
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
FATIGUE UNDER RANDOM AND PROGRAMED LOADS,
by Eugene C. Naumann. Feb 65, 25p
NASA-TN-D-2629

Unclassified report

Descriptors: (*Fatigue(Mechanics), Loading(Mechanics)), (*Aluminum alloys, Fatigue(Mechanics)).

N65-16590 Field 20M
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYTICAL COMPARISON OF RELATIVE HEAT-TRANSFER COEFFICIENTS AND PRESSURE DROPS OF INERT GASES AND THEIR BINARY MIXTURES,
by Michael R. Vanco. Feb 65, 15p
NASA-TN-D-2677

Unclassified report

Descriptors: (*Helium group gases, Transport properties), (*Brayton cycle, Helium group gases).

N65-16597 Field 20K
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
NFLUENCE OF EDGE CONDITIONS ON THE STABILITY OF AXIALLY COMPRESSED CYLINDRICAL SHELLS.
Revised ed.,
by B. O. Almroth. Feb 65, 35p
Contract NAS1 3778
NASA CR-161

Unclassified report

Revision of report dated Aug 64.

Descriptors: (*Cylindrical bodies, Structural shells), (*Loading(Mechanics), Cylindrical bodies).

N65-17880 Field 20I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPERIMENTS ON INDUCTIVE AND CAPACITIVE RADIOFREQUENCY HEATING OF A HYDROGEN PLASMA IN A MAGNETIC FIELD,
by Clyde C. Swett. Mar 65, 17p NASA-TN-D-2717

Unclassified report

Descriptors: (*Plasma medium, Induction heating), (*Induction heating, Plasma medium), Capacitance, Hydrogen.

N65-17966 Field 20H
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ELECTRON-BREMSSTRAHLUNG DIFFERENTIAL CROSS SECTIONS FOR THIN AND THICK TARGETS,
by W. Wayne Scott. Mar 65, 58p NASA-TN-D-2659

Unclassified report

Descriptors: (*Bremsstrahlung, Differential cross section), (*Electrons, Differential cross section).

N65-18209 Field 20K, 13I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECT OF COMPONENT DIFFERENTIAL HARDNESS ON RESIDUAL STRESS AND ROLLING-CONTACT FATIGUE,
by Erwin V. Zaretsky, Richard J. Parker, William J. Anderson, and Steven T. Miller. Mar 65, 14p
NASA-TN-D-2664

Unclassified report

Descriptors: (*Bearings, Hardness), (*Fatigue-(Mechanics), Bearings), Stresses.

N65-18217 Field 20D
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INCIPIENT CAVITATION OF ETHYLENE GLYCOL IN A TUNNEL VENTURI,
by Robert S. Ruggeri, Royce D. Moore, and Thomas F. Gelder. Mar 65, 14p NASA-TN-D-2722
Unclassified report

Descriptors: (*Cavitation, Glycols), (*Glycols, Cavitation).

N65-19899 Field 20F
CFSTI Prices: HC$3.00 MF$0.50

National Bureau of Standards, Washington, D. C.
SOME DEVELOPMENTS IN IMPROVED METHODS FOR THE MEASUREMENT OF THE SPECTRAL IRRADIANCES OF SOLAR SIMULATORS,
by Ralph Stair, William E. Schneider, William R. Waters, John J. Jackson, and Roger E. Brown. Apr 65, 51p
Contract R116
NASA CR-201
Unclassified report

Descriptors: (*Sun, Simulators), (*Light, Optical instruments), Radiometers, Standards.

N65-19915 Field 20K
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
VIBRATIONAL CHARACTERISTICS OF SOME THIN-WALLED CYLINDRICAL AND CONICAL FRUSTRUM SHELLS,
by Jerry D. Watkins and Robert R. Clary. Mar 65, 29p NASA-TN-D-2729
Unclassified report

Descriptors: (*Vibration, Structural shells), (*Conical bodies, Vibration), (*Cylindrical bodies, Vibration).

N65-19923 Field 20N, 4A
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
RADIATIVE TRANSFER IN A CLOUDY ATMOSPHERE,
by R. E. Samuelson. Apr 65, 87p NASA-TR-R-215
Unclassified report

Descriptors: (*Wave transmission, Clouds), (*Clouds, Wave transmission).

N65-20165 Field 20K, 3C
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Center.
LIOUVILLE'S EQUATION AND THE n-BODY PROBLEM,
by R. G. Langebartel. Apr 65, 56p NASA-TRR-217
Unclassified report

Descriptors: (*N-body problem, Statistical mechanics), (*Statistical mechanics, Partial differential equations), Celestial mechanics, Satellites(Artificial).

N65-20478 Field 20M
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
EQUILIBRIUM THERMODYNAMIC PROPERTIES OF CARBON DIOXIDE,
by Harry E. Bailey. 1965, 66p NASA-SP-3014
Unclassified report

Descriptors: (*Carbon dioxide, Thermodynamics).

N65-20999 Field 20L, 7D
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
TRANSPORT PHENOMENA IN ALUMINUM OXIDE,
by Myron O. Davies. Apr 65, 12p
NASA-TN-D-2765
Unclassified report

Descriptors: (*Aluminum compounds, Oxides), (*Oxides, Transport properties).

N65-21433 Field 20M
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
METHOD FOR ESTIMATING RATIO OF ABSORPTANCE TO EMITTANCE,
by Robert R. Hibbard. Apr 65, 13p NASA-TN-D-2751
Unclassified report

Descriptors: (*Heat transfer, Graphics).

N65-21640 Field 20D
CFSTI Prices: HC$3.00 MF$0.75

General Dynamics/Astronautics, San Diego, Calif.
AN APPROXIMATE NONLINEAR ANALYSIS OF THE STABILITY OF SLOSHING MODES UNDER TRANSLATIONAL AND ROTATIONAL EXCITATION,
by T. R. Rogge and H. J. Weiss. Apr 65, 63p
Contract NAS8 11193
NASA CR-220
Unclassified report

Descriptors: (*Sloshing, Stability).

N65-22970 Field 20D
CFSTI Prices: HC$1.00 MF$0.50

General Dynamics/Astronautics, San Diego, Calif.
A NONLINEAR ANALYSIS FOR SLOSHING FORCES AND MOMENTS ON A CYLINDRICAL TANK,
by H. J. Weiss and T. R. Rogge. Apr 65, 10p
Contract NAS8 11193 Unclassified report
NASA CR-221

Descriptors: (*Sloshing, Mechanics), (*Tanks-(Containers), Sloshing).

N65-23162 Field 20M, 14B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.

TECHNIQUE FOR MEASURING HIGH-TEMPERATURE SIOTHERM PATTERNS ON AERODYNAMICALLY HEATED MODELS WITH EXPERIMENTAL RESULTS,
by Irving Weinstein and Robert R. Howell.
May 65, 46p NASA-TN-D-2769

Unclassified report

Descriptors: (*Aerodynamic heating, Temperature sensitive elements), (*Temperature sensitive elements, Aerodynamic heating).

N65-23816 Field 20M
CFSTI Prices: HC$3.00 MF$0.75

Hughes Research Labs., Malibu, Calif.
TEMPERATURE DISTRIBUTION IN A SPINNING SPHERICAL SHELL IN THE SOLAR FLUX. UNIFORMLY VALID PERTURBATION EXPANSION FOR A THIN SHELL,
by W. P. Brown, Jr. May 65, 57p
Contract NASw1056
NASA CR-233

Unclassified report

Descriptors: (*Spheres, Structural shells), (*Perturbation theory, Spheres), (*Thermodynamics, Structural shells), Spin, Temperature, Solar radiation.

N65-23824 Field 20K, 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EFFECT OF EDGE LOADINGS ON THE VIBRATION OF RECTANGULAR PLATES WITH VARIOUS BOUNDARY CONDITIONS,
by George E. Weeks and John L. Shideler. May 65, 35p NASA-TN-D-2815

Unclassified report

Descriptors: (*Loading(Mechanics), Vibration), (*Vibration, Rectangular bodies), Structural parts.

N65-23825 Field 20M, 13A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ONSET OF FLOW OSCILLATIONS IN FORCED-FLOW SUBCOOLED BOILING,
by Frank A. Jeglic and Thomas M. Grace.
May 65, 35p NASA-TN-D-2821

Unclassified report

Descriptors: (*Heat transfer, Boiling), (*Boiling, Oscillation).

ORNL-3702 Field 20H
CFSTI Prices: HC$3.00 MF$0.75

Oak Ridge National Lab., Tenn.
A New Technique for Measuring Range of Low Energy Charged Particles in Conducting Solids.
by A. K. Roecklein, M. Y. Nakai, and E. T. Arakawa.
Mar 65, 57p
Contract W-7405-ENG-26

Unclassified report

Descriptors: (*Changed particles, Solid state physics), (*Proton beams, Theory).

PB-167 733 Field 20M, 20K
CFSTI Prices: HC$2.00 MF$0.50

Minnesota Univ., Minneapolis. Inst. of Tech.
THE THERMAL PROBLEM IN THE DYNAMICS OF LINEAR ELASTIC SHELLS,
by C. N. DeSilva and S. J. Allen. Apr 64, 30p
Grant NSF G20192

Unclassified report

Descriptors: (*Elastic shells, Thermodynamics), Deformation, Linear systems, Partial differential equations, Simultaneous equations, Theory, Dynamics, Thermal conductivity, Heating, Stresses, Strain-(Mechanics).

The dynamics of thermoelastic shells is considered with emphasis on a linear theory. The three-dimensional heat conduction equation, with the dilatational effect included, is studied, and from it is deduced a pair of simultaneous equations, valid in the middle surface space. This pair of equations is shown to reduce to forms relevant to a Love-Kirchhoff theory, a Green-Zerna theory and a shallow shell theory. (Author)

PB-167 735 Field 20A, 11F
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
EFFECTS OF ULTRASOUND ON DEFORMATION CHARACTERISTICS OF STRUCTURAL METALS: PART I. APPLICATION OF PHOTOELASTICITY.
Technical progress rept. for 1 Jul 63-30 Jun 64,
by W. H. Frandsen and J. A. M. Langenecker.
Aug 64, 13p Rept. no. TPR-371, NOTS-TP-3622
Task RRMA24 064 216 1R007 09 09
AD 446 394; N64 33585

Unclassified report

Descriptors: (*Ultrasonic radiation, Metals), (*Metals, Ultrasonic radiation), (*Photoelasticity, Metals), Deformation, Energy conversion, Propagation, Rods, Heat, Dynamics, Crystal lattice defects, Stresses, Model tests.

Intense ultrasound having power levels up to 100 w/sq cm at 20 kc is used in studies of mechanisms of metal deformation and treatment. To provide accurate quantitative information about the underlying experimental conditions, Part 1 of this progress report describes detailed investigations of modes of propagation of intense ultrasonic stress waves in rods and bars. Part 2 will be concerned with measurements of conversion of acoustic energy into heat and kinetic energy of lattice imperfections. Parts 3 and 4 will illustrate experiments in which high strain rate tensile tests, and intense pulsed ultrasound were applied. A discussion of ultrasonic metal deformation will be given in the final Part 5 along with a comparison of our observations with results and viewpoints from other reports on this subject.

PB-167 736 Field 20C, 10B
CFSTI Prices: HC$2.00 MF$0.50

Avco-Everett Research Lab., Everett, Mass.
DESIGN, DEVELOPMENT, AND TEST OF A PROTOTYPE SELF-EXCITED MHD GENERATOR.
Semi-annual technical summary rept.
Sep 63, 40p
Contract AF33 657 8380, ARPA Order 291-62
AD 417 166

Unclassified report

Descriptors: (*Magnetohydrodynamics, Generators), (*Electric power production, Magnetohydrodynamics),

Enthalpy, Combustion, Excitation, Design, Plasma physics, Fuel systems, Magnets, Cooling, Tests, Control systems, Performance(Engineering).

Minor alterations of the burner design were made. During analysis of the cooling water system in the pilot burner, it was found that the safety factor on burnout was too small. The problem was solved by lowering the enthalpy of the combustion gases by dilution with nitrogen. This resulted in a modification of the pilot burner control system. In addition, some modification of the main fuel system and oxygen system was made. The design of the generator channel was completed although minor modifications in the detailed channel design were made. An instrumentation system was designed to measure generator performance and to monitor the functioning of the control system.

PB-167 741 Field 20C, 20F
CFSTI Prices: HC$1.00 MF$0.50

California Inst. of Tech., Pasadena.
DESIGN OF COIL ARRAY FOR DEGAUSSING THE HORIZONTAL COMPONENT OF THE LOCAL FIELD FOR THE C. I. T. COMPTON-EJECTION SPECTROMETER.
Technical progress rept. no. 5,
by Jesse W. M. DuMond. 20 Nov 62, 17p
Grant NSF G19223

Unclassified report

Descriptors: (*Degaussing, Spectrum analyzers), (*Coils, Design), Magnetic fields, Beta-ray spectroscopy.

PB-167 784 Field 20M
CFSTI Prices: HC$4.00 MF$1.00

Oklahoma State Univ., Stillwater.
FORCED CONVECTION NUCLEATE BOILING DATA FOR LOW HEAT FLUX DENSITIES TO WATER CONTAINING A VOLATILE ADDITIVE.
Doctoral thesis,
by Mahmoud Hood Sabet. May 62, 135p
Grant NSF G10162

Unclassified report

Descriptors: (*Nucleate boiling, Heat transfer), (*Heat transfer, Nucleate boiling), Experimental data, Heat, Water, Additives, Alcohols, Ketones, Mixtures, Correlation techniques.

Experimental nucleate boiling heat transfer data during forced circulation was determined, correlated, and analyzed for distilled and degassed water containing a volatile additive. The experimental data in the fully developed nucleate boiling region for the water, the Methanol mixtures and the n-Butanol mixtures were correlated by means of the Forster-Greif correlation equation. The wall temperature remained very nearly constant throughout the boiling length of the tube for water, but for the mixtures it decreased steadily downstream from a maximum value near the start of local boiling. The transition region between non-boiling and local boiling heat transfer was found to be composed of two portions having different characteristics. The superheat for water when it contained an additive was generally higher than that of pure water at the same heat flux.

PB-167 801 Field 20L, 20B, 12A
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
SOME REMARKS ON THE COMBINATORIAL APPROACH TO THE ISING PROBLEM,
by P. N. Burgoyne. Apr 63, 27p
Grant NSF GP2

Unclassified report

Descriptors: (*Combinatorial analysis, Crystal lattices), (*Crystal lattices, Combinatorial analysis), Electron transitions, Crystal structure, Atomic energy levels, Alloys.

A new proof is given of a certain conjecture due to Feynman. This conjecture relates graphs and paths on a lattice and was first proved by Sherman. It is the key step in a particular method of obtaining Onsager's formula for the partition function of the two dimensional Ising model. (Author)

PB-167 821 Field 20D
CFSTI Prices: HC$6.00 MF$1.25

Massachusetts Inst. of Tech., Cambridge.
FLOW OF GASES THROUGH POROUS SOLIDS UNDER THE INFLUENCE OF TEMPERATURE GRADIENTS.
Doctoral thesis,
by Herbert Henry Engel. Jun 59, 237p
Grant NSF G5077

Unclassified report

Descriptors: (*Porous materials, Gas flow), (*Gas flow, Porous materials), Solids, Glass, Stainless steel, Surface properties, Adsorption, Thermal properties, Thermodynamics, Permeability, Hydrogen, Helium, Nitrogen, Argon, Alkenes, Test equipment, Test methods.

The object of the investigation is to provide a better understanding of the mechanism of surface flow. Specifically, the surface flow of pure, adsorbed gases under the influence of temperature gradients is experimentally investigated. From its inception the study was to provide a means of correlating surface flow under a temperature gradient by means of physical quantitites that could be determined from experiments other than non-isothermal surface flow rate measurements. It was hoped that accomplishment of these objectives might furnish a more fundamental knowledge of the principles involved in the interaction between a solid surface and gas molecules in contact with it.

PB-167 832 Field 20B
CFSTI Prices: HC$1.00 MF$0.50

Martin Co., Orlando, Fla. Materials Research Lab.
X-RAY DIFFRACTION FROM DEFORMED CERIUM: EFFECTS DUE TO EXTRINSIC STACKING FAULTS.
Technical rept.
by Henry M. Otte and Henry Chessin. Feb 65, 22p
Rept. no. OR-6427, TR-11
Contract Nonr370600
AD 459 023

Unclassified report

Descriptors: (*X-ray diffraction analysis, Cerium), (*Cerium, Deformation), Crystal lattice defects, Cold working, Measurement.

Preliminary measurements of the peak shifts in the X-ray powder pattern of cerium cold-worked by filing at room temperature are reported. Because cerium oxidizes rapidly in the atmosphere, the experimental procedure is more complicated than that usually

followed in the preparation of cold-worked metal filings for the measurement of intrinsic faults. The preliminary data on cold-worked cerium, although of lower accuracy than that normally attainable in this type of work, nevertheless showed peak displacements in the Debye-Scherrer pattern that were in most cases in the direction theoretically predicted for relatively low probabilities of extrinsic stacking faults. A more detailed investigation is required to verify the line broadening and asymmetry effects produced in the line profiles. The observations were complicated by an apparent annealing out of the peak shifts at room temperature although the increased (extrapolated) lattice parameter remained. (Author)

PB-167 833 Field 20B
CFSTI Prices: HC$2.00 MF$0.50

Martin Co., Orlando, Fla. Materials Research Lab.
DIFFRACTION EFFECTS FROM FAULTS IN ULTRA PURE CARBON AND STACKING FAULTS IN ALPHA URANIUM.
Technical rept.,
by Henry M. Otte, Irwin D. Blucher, and A. G. Crocker.
Feb 65, 27p Rept. no. OR-6414, TR-9
Contract Nonr370600
AD 458 856

Unclassified report

Descriptors: (*Electron microscopy, Carbon), (*Carbon, Crystal lattice defects), (*Uranium, Crystal lattice defects), Electron diffraction analysis, Diffraction analysis.

This report describes the results of electron microscope examination of ultrapure spectroscopic carbon and describes the transmission images and diffraction patterns in terms of stacking faults and dislocations. It also discusses the stacking faults in alpha uranium. (Author)

PB-167 865 Field 20-, 18-
CFSTI Prices: HC$2.00 MF$0.50

American Inst. of Physics, New York. Documentation Research Project.
CURRENT PHYSICS ARTICLES, VOLUME O, NUMBER O.
1962, 41p
Supported by NSF. Unclassified report

Descriptors: (*Physics, Bibliographies), Documentation, Reports, Indexes.

This current awareness journal is composed of two parts: 1) the tables of contents of the journals covered; 2) a classivied index, using a very limited number of headings, listing each paper, ordinarily only once, with a full citation (title, authors, journal title, volume, date, and page). A significant feature of this experiment is the addition to every listed paper of a symbol to designate the major orientation of the paper.

PB-167 878 Field 20B, 20K
CFSTI Prices: HC$1.00 MF$0.50

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
MODES OF VIBRATION OF PIEZOELECTRIC QUARTZ CRYSTALS.
Annual rept. for 1 Jul 61-30 Jun 62,
by Arthur L. Bennett. 30 Jun 62, 16p
Grant NSF G18972, Proj. B214 Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Piezoelectric crystals, Vibration), (*Vibration, Piezoelectric crystals), (*Quartz, Piezoelectric crystals), Measurement, X-ray diffraction analysis, Polarization, Crystal lattice defects, Low frequency, Medium frequency, High frequency.

Research was conducted concerning the measurement, analysis, and prediction of the modes of vibration of quartz peizoelectric crystals.

PB-167 883 Field 20D, 1A
CFSTI Prices: HC$3.00 MF$0.75

State Univ. of New York, Buffalo. Dept. of Mechanical Engineering.
STUDIES OF CORNER AND BEND FLOWS BY MEANS OF THE ELECTROLYTIC TANK ANALOGY.
Research rept. no. 3, 1 Oct 60-30 Sep 62,
by Ronald E. Stanford and Justin F. Sucato. Jun 61, 54p
Grant NSF G14548

Unclassified report

Descriptors: (*Boundary layer, Aerodynamic configurations), Turbulence, Two-dimensional flow, Axially symmetric flow, Fluid flow, Velocity, Electric currents, Partial differential equations, Rotation, Deformation.

Current studies of the boundary layer characteristics for various two-dimensional and axially symmetric configurations has illustrated the need for obtaining the corresponding potential flow pressure distributions at the edge of the boundary layer. Specifically, it is desired that the variation of velocity and pressure distributions at the corner of 90 degree change in channel flow for different radii and channel widths be obtained. The electrical analogy method was used. Two configurations were completely investigated; these two geometries have the same channel widths, but differ at the corner, one has a sharp corner while the other has a radius. Their velocity distributions are listed, while the difference in flow nets is indicated.

PB-167 896 Field 20F
CFSTI Prices: HC$1.00 MF$0.50

Armour Research Foundation, Chicago, Ill.
ELEVATED TEMPERATURE STUDIES OF INFRARED TRANSPARENT MATERIALS.
Quarterly progress rept. no. 1, 1 Oct-30 Dec 59.
15 Jan 60, 12p
Contract N123 60530 2167A, Proj. 1159
AD 231 253

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Infrared optical materials, High-temperature research), (*Infrared windows, High-temperature research), Optical properties, Thermal properties, Thermal conductivity, Specific heat, Density, Measurement, Sapphires, Magnesium compounds, Fluorides.

The purpose of the project is to measure optical and thermal properties of a number of IR window materials in the temperature range from room temperature to 1000C. The optical properties of interest are spectral transmissivity, reflectivity and emissivity, spectral refractive index and absorption coefficient. The thermal properties to be measured are, thermal conductivity, expansion coefficient, and specific heat. Density at ambient temperature

will also be measured. The materials to be investigated will include but not be restricted to sapphire, magnesium fluoride, B and L. Type IR20 and G.E. Type IR2. Summary: The effort during the period has been devoted to adaptation of available equipment to the specific needs of the project. (Author)

PB-167 902 Field 20D, 1A
CFSTI Prices: HC$2.00 MF$0.50

State Univ. of New York, Buffalo. Dept. of Mechanical Engineering.
FLOW IN THE STEM SECTION OF A RADIAL DIFFUSER.
Research rept. no. 9, 1 Oct 60-30 Sep 62,
by George W. Haering and Pascal A. Zanzano.
May 62, 40p
Grant NSF G14548 Unclassified report

Descriptors: (*Diffusers, Fluid flow), Pressure, Differential equations, Theory.

Flow in a radial diffuser is greatly influenced by the behavior of the fluid in the stem section. The determination of the flow in this section is the concern of the report. The object is to determine what changes in velocity profile will occur for flow in the stem section against the existing pressure gradient.

PB-167 911 Field 20H, 18D, 3B
CFSTI Prices: HC$2.00 MF$0.50

Minnesota Univ., Minneapolis. School of Physics.
CONTINUOUS BALLOON MONITORING OF COSMIC RAYS AND SOLAR PHENOMENA.
Final rept.,
by John R. Winckler. Dec 60, 29p
Grant NSF G13833
Unclassified report

Descriptors: (*Cosmic rays, Solar radiation), (*Solar radiation, Cosmic ray telescopes), (*Balloons, High altitude), Cosmic ray bursts, Ionization chambers, Astrophysics.

A series of high altitude balloon monitoring flights for cosmic rays and solar phenomena is summarized.

PB-167 921 Field 20M
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
SOME ASPECTS OF THE SOLID-LIQUID TRANSITION (Quelques Aspects de la Transition Solide-Liquide),
by Pierre Hicter and Yves Malmejac. May 65, 78p
CEA-R-2752
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Phase studies, Melting), (*Melting, Phase studies), Solids, Liquids, Nucleation, Metallurgy, Thermodynamics, Solid state physics, France.

Current theories of fusion are analysed and grouped by analogies using a unified symbolism to facilitate comparisons. Theories are presented based on solid state vibrational models, nucleation models, order-disorder models, vacancies and dislocations. For each model the authors have separated out the hypotheses underlying the theoretical analysis and defined the essential parts of the theoretical development. Principal results are compared with experimental data. (Author)

PB-167 923 Field 20H
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CALCULATION OF THE MUON CONTAMINATION IN A PI-MESON BEAM (Calcul de la Contamination en Muons d'un Faisceau de Mesons Pi),
by Anh Ha Tran. May 65, 18p CEA-R-2778
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Pions, Particle beams), (*Muons, Pions), Meson bombardment, Meson cross sections, Programming(Computers), France.

A method is presented for calculating the muon contamination of a pi-meson beam which is parallel and of cylindrical symmetry. The 'CONTAMU' program which makes it possible to carry out the calculation is presented. An evaluation of the muon contamination is necessary for correcting the experimental values (gross) of the cross-sections of the various reactions using the pi-meson beam as a beam of incident particles. The muon contamination is calculated for the case of the beam passing through one counter and for the beam passing successively through two counters. (Author)

PB-167 924 Field 20H
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
DOUBLE TIME-OF-FLIGHT FAST NEUTRON SPECTROMETRY AND STUDY OF THE REACTION (9)Be (n,2n) (Spectrometrie de Neutrons Rapides a Double Temps-de-Vol et Etude de la Reaction (9)Be (n,2n)).
Doctoral thesis,
by Jean-Claude Gondrand. 1965, 43p CEA-R-2734
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Neutron reactions, Beryllium), (*Neutron spectrum, Fast neutrons), Neutron transport theory, France.

The interaction between 14.5 MeV neutrons and 9Be was studied by a double time-of-flight method. Energy E1 and E2 of the (n,2n) reaction was measured (over all resolution 2 ns, flight path 1,50 m), the two neutrons being in the same plane with incident neutron and the scattering angle 30 deg (angular resolution 3) : 310 (n,2n) events were identified by electronic method (with photographic control) and by the cinematics (430 back-ground events, 1,3x10 to the 11th power incident neutrons, one (n,2n) event per hour) corresponding principally (> 90 per cent) to formation resonant states between 4 particles 2 alpha and 2n) of the final state: 8Be(0) sigma = 170 mb, 8Be* (2,9 MeV sigma = 165 mb, 9Be* (6.76 MeV) 8Be(0) sigma = 95 mb. (Author)

PB-167 929 Field 20H
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
GIANT RESONANCE AND DIPOLAR STATES OF LIGHT NUCLEI (La Resonance Geante et les Etats Dipolaires des Noyaux Legers).
Doctoral thesis,
by Jacques Miller. 1965, 74p CEA-R-2736
Unclassified report

Text in French with attached summary in English.

Descriptors: (*Nuclear resonance, Nuclear energy levels), (*Gamma-neutron reactions, Nuclear resonance), Nuclei, Nuclear shell models.

Cross-section for (gamma, n) reactions on C12, O16, Mg24 and Ca40 have been measured using monochromatic gamma rays of variable energy obtained from the annihilation in flight of fast positrons. We compare the observed structure with the shell model of nucleus, including residual interaction between nucleons by hole particle techniques. (Author)

PB-167 933 Field 20L, 20B
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
STUDY OF RECOMBINATION PROCESSES FOR 'ELECTRON-HOLE' PAIRS IN GERMANIUM IRRADIATED BY GAMMA RAYS FROM (60)Co USING THE PHOTOVOLTAIC EFFECT IN P-N JUNCTIONS (Etude du Processus de Recombinaison des Paires 'Electron-Trou' dans le Germanium Irradie par les Rayons gamma du (60)Co a l'Aide de l'Effet Photovoltaique dans les Jonctions P-N).
Doctoral thesis,
by Ali-Asghar Zahedi-Moghadam. 1965, 74p
CEA-R-2723

Unclassified report

Text in French with attached summary in English.

Descriptors: (*Semiconductors, Radiation damage), (*Crystal lattice defects, Semiconductors), (*Germanium, Electrical properties), Gamma rays, Cobalt, Photoelectric effect, France.

Using the photo-voltaic effect in p-n junctions, we have studied, during bombardment, the mecanism of the recombination of electron-hole pairs in the presence of structure defects produced in germanium of the N and P types by gamma rays from a 60Co source. At 310K the level of the recombination centres is situated 0.25 eV above the conduction band and the capture cross-sections of the holes and of the electrons have the respective values of: sigma sub p = 4 X to the - 15th power cm sq and sigma sub n = 3 X 10. The value of sigma sub p appears to be under-estimated because the number of defects in P-type samples appears to be lower than that in N-type samples. These results lead to the conclusion that the interstitials are responsible for the recombination. (Author)

PB-167 947 Field 20F, 6D
CFSTI Prices: HC$1.00 MF$0.50

Chrysler Corp., Centerline, Mich.
CHRYSLER OPTICAL PROCESSING SCANNER (COPS). A CHARACTER RECOGNITION SYSTEM WHICH IS INDEPENDENT OF CHARACTER, TRANSLATION, SIZE OR ORIENTATION,
by D. N. Buell. 1960, 19p

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Character recognition, Optical scanning), (*Optical scanning, Character recognition), Bionics, Psychophysiology, Visual perception, Computer logic, Computers, Numerical methods and procedures, Pattern recognition.

A character recognition system is described which incorporates a lens-and-retina input and a relatively simple computer. The system operates effectively with the image focused anywhere on the retina and may operate so as to be independent of image, size or orientation. The characters which may be unambiguously, discriminated are those which have distinct transform functions T. A simple algorithemm is given for obtaining T for both curvilinear and rectilinear figures. Examples are given and possible means of resolving the ambiguities discussed. (Author)

PB-167 957 Field 20B
CFSTI Prices: HC$2.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
CONTRIBUTION TO THE STUDY OF DEFECT QUENCHING IN GOLD (Contribution a l'Etude de la Trempe des Lacunes dans L'or),
by Jacques Hillairet, Jean Delaplace, Claude Mairy, and Yves Adda. Dec 64, 50p
Rept. no. CEA-R-2593

Unclassified report

Text in French, attached summary in English.

Descriptors: (*Gold, Crystal lattice defects), (*Crystal lattice defects, Gold), Wires, Quenching(Cooling), Resistance(Electrical), Heat treatment, Electron microscopy, Dynamics.

A study was made by resistivity measurements at low temperatures of the influence of quenching conditions on the behaviour of defects in gold. Gold wires of 0.3 and 0.5 mm diameter having a purity of 99.999 per cent were quenched from a high temperature and in various liquids. For cooling rates of 25,000C/second and above all the defects n equilibrium at high temperature are retained by quenching. The annealing of the defects thus obtained occurs in two stages, the first below 150C and the second between 450 and 650C. The mobility energy of the defects which are annealed during the first stage is 0.70 ± 0.06 eV. The annealing kinetics depend on the initial concentration of the defects and of the diameter of the sample. The second stage corresponds to disappearance of the stacking fault tetrahedra which are formed from defect packets during annealing. The formation energy of the defects measured on the 0.5 mm samples is 0.94 eV. The values obtained with 0.3 mm diameter samples, much lower than 0.94 eV, can be explained by assuming that packets of defects occur at the end of the annealing of the samples. Electron microscope observations have been carried out on strips of annealed gold. (Author)

PB-167 981 Field 20L, 18H
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Fontenay-Aux-Roses (France). Centre d'Etudes Nucleaires.
CRYSTALLOGRAPHIC STUDY AND SELF IRRADIATION DAMAGE ON PLUTONIUM AT LOW TEMPERATURE (Etude Cristallographique et Effets de l'Autoirradiation sur le Plutonium a Basse Temperature).
Doctoral thesis,
by Pierre Solente. May 65, 58p
Rept. no. CEA-R-2735

Unclassified report

Text in French, attached summary in English.

Descriptors: (*Plutonium, Radiation damage), (*Crystallography, Plutonium), (*Cryogenics, Plutonium), Low-temperature research, Antiferromagnetism, Transition temperature, Thermal expansion, Aluminum alloys, Plutonium alloys.

A study was made of the variation of the parameters of alpha plutonium and aluminium stabilised delta alloys at low temperature, in order to verify the existence of an

antiferromagnetic transition at low temperature. The effects of alpha particles on the length of a polycrystal of alpha plutonium at 4,2 K are also presented at 18 K alpha plutonium shows no crystallographic change from its structure at room temperature. The thermal expansion coefficients along the 3 axis seem to be positive at this temperature. Therefore a magnetic contribution on thermal expansion coefficients must be small. A dilatation anomaly of delta Pu has been observed at 100 K, together with an anomaly of the diffraction lines intensity. No surstructure line has been observed at 20 K. The length of alpha plutonium increases with time at a rate of about 5 x 0,000001 per hour when held in liquid helium. This effect is attributed to the creation of Frenkel pairs. (Author)

PB-168 003 Field 20B, 11F
CFSTI Prices: HC$3.00 MF$0.75

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ELECTRON MICROSCOPE OBSERVATION OF SINGLE-CRYSTALLINE BERYLLIUM THIN FOILS (Observation de Lames Minces Monocristallines de Beryllium en Microscopie Electronique),
by Jacqueline Antolin, Jean-Paul Poirier, and Jean-Michel Dupouy. May 65, 53p Rept. no. CEA-R-2789
Unclassified report

Text in French, attached summary in English.

Descriptors: (*Beryllium, Crystal lattice defects), (*Single crystals, Beryllium), (*Foils, Beryllium), (*Electron microscopy, Beryllium), Deformation.

Thin foils prepared from single crystalline beryllium simples deformed at room temperature, have been observed by transmission electron microscopy. The various deformation modes have been investigated separately, from their early stages and their characteristic dislocation configurations have been observed. Basal slip is characterized at is outset by the presence of numerous dipoles and elongated prismatic loops. More pronounced cold work leads to the formation of dislocation tangles and bundles which eventually give a cellular structure. Prismatic slip begins by the cross-slip of dislocations from the basal plane into the prismatic plane. A cellular structure is equally observed in heavily deformed samples. Sessile dislocations have been observed in twin boundaries; they are produced by reactions between slip dislocations and twin dislocations. (Author)

SC-RR-64-1701 Field 20I
CFSTI Prices: HC$2.00 MF$0.75

Sandia Corp., Albuquerque, N. Mex.
Operation Characteristics of the Sandia 120-KW Plasma Arc Tunnel,
by P. T. Lubeck. Nov 64, 41p Unclassified report
Contract AT(29-1)-789
Descriptors: (*Plasma jets, Test facilities).

UCRL-7611 (Rev. 1) Field 20B
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
Crystal Reflectivity and Reactor Spectrum Measurements,
by Ian R. Jones. 9 Dec 63, 16p Unclassified report
Contract W-7405-ENG-48
Descriptors: (*Neutron beams, Diffraction analysis), (*Single crystals, Reflection).

UCRL-7680 Field 20B
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
FURTHER COMMENTS ON RECEIVING APERTURE WIDTHS IN SINGLE CRYSTAL DIFFRACTOMETRY,
by Gordon S. Smith and Leroy E. Alexander.
4 Feb 64, 4p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Single crystals, X-ray diffraction analysis).

UCRL-7838 Field 20M, 12B
CFSTI Prices: HC$3.00 MF$0.75

Lawrence Radiation Lab., Univ. of California, Livermore.
NUMERICAL METHODS FOR NONLINEAR RADIATION TRANSPORT CALCULATIONS,
by Philip M. Campbell and Robert G. Nelson.
29 Sep 64, 56p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Transport properties, Monte Carlo method), (*Numerical methods and procedures, Transport properties).

UCRL-7960 Field 20M
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
A PROCEDURE FOR THE NUMERICAL TREATMENT OF GENERALIZED HEAT-TRANSFER PROBLEMS,
by Michael D. Mintz. Nov 64, 36p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Heat transfer, Numerical analysis).

UCRL-11219 Field 20H
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
ON THE THREE-BODY SCATTERING AMPLITUDE. III. SCATTERING A BOUND STATE,
by Roland L. Omnes. 16 Jan 64, 16p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Elementary particles, Scattering), (*Scattering, Elementary particles).

UCRL-12218 Field 20J
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab.. Univ. of California, Livermore.
EVALUATION OF THE HYDROGENIC MATRIX ELEMENT,
by Margaret J. Fulton, and Marvin H. Mittleman.
21 Jan 65, 34p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Quantum mechanics, Hydrogen), (*Hydrogen, Matrix algebra).

21. Propulsion and Fuels

N65-17461 Field 21H
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPERIMENTAL STUDY UNDER GROUND-HOLD CONDITIONS OF SEVERAL INSULATION SYSTEMS FOR LIQUID-HYDROGEN FUEL TANKS OF LAUNCH VEHICLES,
by Porter J. Perkins, Jr. Mar 65, 25p
NASA-TN-D-2679
Unclassified report

Descriptors: (*Fuel tanks, Launch vehicles(Aerospace)), (*Thermal insulation, Fuel tanks), Liquified gases, Hydrogen.

N65-17463 Field 21B, 21I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECT OF PRESSURE ON RATE OF BURNING (DECOMPOSITION WITH FLAME) OF LIQUID HYDRAZINE,
by Albert C. Antoine. Mar 65, 9p
NASA-TN-D-2694
Unclassified report

Descriptors: (*Combustion, Hydrazines), (*Hydrazines, Burning rate).

N65-19284 Field 21B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
OXYGEN-JET BEHAVIOR DURING COMBUSTION INSTABILITY IN A TWO-DIMENSIONAL COMBUSTOR,
by Marcus F. Heidmann. Mar 65, 12p
NASA-TN-D-2725
Unclassified report

Descriptors: (*Liquefied gases, Combustion), (*Oxygen, Combustion).

N65-19846 Field 21B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
OSCILLATORY COMBUSTION OF A LIQUID-OXYGEN JET WITH GASEOUS HYDROGEN,
by Marcus F. Heidmann. Mar 65, 24p
NASA-TN-D-2753
Unclassified report

Descriptors: (*Liquefied gases, Combustion), (*Oxygen, Combustion).

N65-20993 Field 21I, 21B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECT OF OXIDIZER PARTICLE SIZE ON SOLID-PROPELLANT COMBUSTION STABILITY,
by Gerald Morrell and Murray L. Pinns. Apr 65, 13p NASA-TN-D-2736
Unclassified report

Descriptors: (*Solid rocket propellants, Combustion), (*Solid rocket oxidizers, Particle size).

N65-22360 Field 21I, 20D
CFSTI Prices: HC$3.00 MF$0.75

General Dynamics/Astronautics, San Diego, Calif.
LIQUID PROPELLANT SLOSHING IN MOBILE TANKS OF ARBITRARY SHAPE,
by D. O. Lomen. Apr 65, 60p
Contract NAS8 11193
NASA CR-222
Unclassified report

Descriptors: (*Sloshing, Propellant tanks), (*Liquid rocket propellants, Sloshing).

N65-23253 Field 21C, 14B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SPACE ENVIRONMENT FACILITY FOR ELECTRIC PROPULSION SYSTEMS RESEARCH,
by Robert C. Finke, Arthur D. Holmes, and Thomas A. Keller. May 65, 37p NASA-TN-D-2774
Unclassified report

Descriptors: (*Electric propulsion, Test facilities), (*Space environmental conditions, Simulation).

N65-23713 Field 21H
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ANALYSIS OF PRESSURIZED AND AXIALLY LOADED ORTHOTROPIC MULTICELL TANKS,
by Robert E. Blum. May 65, 18p
NASA-TN-D-2799
Unclassified report

Descriptors: (*Pressure vessels, Fuel tanks), (*Fuel tanks, Pressure vessels).

N65-23815 Field 21I, 20D
CFSTI Prices: HC$2.00 MF$0.50

General Dynamics/Astronautics, San Diego, Calif.
DIGITAL ANALYSIS OF LIQUID PROPELLANT SLOSHING IN MOBILE TANKS WITH ROTATIONAL SYMMETRY,
by D. O. Lomen. May 65, 36p
Contract NAS8 11193
NASA CR-230
Unclassified report

Descriptors: (*Sloshing, Programming(Computers)), (*Liquid rocket propellants, Sloshing).

Patent 3,188,806 Field 21H, 16D

SUPPORT FOR REACTION MOTOR.
Patent assigned to Army,
by Janvier F. O'Hara. 15 Jun 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Rocket motors, Supports), (*Supports, Rocket motors), Propellant tanks, Load distribution, Thrust, Cylindrical bodies, Loading(Mechanics), Conoidal bodies, Guided missiles, Patents, Metal plates.

The support structure is for the reaction motor of a missile. The motor is connected to a conoidal shaped support which distributes the motor thrust load to the cylindrical walls of the rocket whereby the tank wall is evenly loaded or stressed completely around its circumference.

Patent 3,191,379 Field 21H, 21I

PROPELLANT GRAIN FOR ROCKET MOTORS.
Patent assigned to NASA,
by Ralph M. Pierce. 29 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Rocket motors(Solid propellant), Propellant control), (*Rocket propellant grains, Burning rate), (*Propellant control, Rocket motors(Solid propellant)), Rocket motors, Thermal insulation, Combustion chamber gases, Solid rocket propellants, Patents.

The solid propellant rocket motor is so constructed and arranged that the propellant grain burns through to the case over its entire inner surface at the instant of complete burnout. Thus, during the burning period of the rocket motor, the propellant itself serves as thermal insulation for the case, shielding the latter against the high temperature combustion gases, and at the moment any of the case is first exposed to the hot gases, the combustion process ceases, due to exhaustion of the propellant.

Patent 3,192,289 Field 21H, 21I

METHOD OF CASTING SOLID PROPELLANT ROCKET MOTORS.
Patent assigned to Navy,
by Leonard T. Jagiello. 29 Jun 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Solid rocket propellants, Casting), (*Casting, Solid rocket propellants), Rocket motors-(Solid propellant), Rocket propellant grains, Acrylic resins, Epoxy plastics, Ammonium compounds, Perchlorates, Aluminum, Aging(Materials), Patents, Powder metals.

The process is for casting composite propellant grains in a rocket motor. The constituents include polybutadiene acrylic acid, epoxy resin, ammonium perchlorate and aluminum. The mixture is cast into the motor about a mandrel, the motor is spun along its axis so that the metal particles migrate from the center and cured until a solid grain forms within the motor.

PB-167 982 Field 21D, 7C
CFSTI Prices: HC$4.00 MF$1.00

Utah Univ., Salt Lake City. Dept. of Fuels Engineering.
KINETIC STUDIES OF THERMAL DISSOLUTION OF HIGH VOLATILE BITUMINOUS COAL.
IM REPT.,
by Hassan Hariri and George Richard Hill. 1964, 123p
Contract 14 01 0001 271
Unclassified report

Descriptors: (*Coal, Solvent extraction), (*Solvent extraction, Coal), (*Reaction kinetics, Solvent extraction), Solvents, Pyrolysis, Theory, Aromatic compounds, Test methods.

The kinetics of the coal extraction has been studied. The solvent used for the study was 1,2,3,4 tetrahydronaphthalene (tetralin). This solvent was known to have the capacity of donating hydrogen at a temperature of about 400C and higher, therefore, a series of experiments were performed in the range of 350C to 450C. Experiments were performed for eight different temperatures. The kinetic results along with a new approach to the theory and mechanism of solvent extraction are described. A series of first order reactions are proposed for the solvent extraction of coal. At the beginning of the reaction the activation energy was found to be 37.2 kilocalories per mole, and at the end of the extraction process the activation energy necessary to break the bonds amounted to 85.5 kilocalories per mole. The magnitude of the rate of change of enthalpy is correct for chemically determined reaction rates. Distillation of liquid products of the solvent extraction process shows that solvent extraction at lower temperature results in heaver liquid products. At higher temperatures lighter materials are found. These results show that at higher temperatures extraction, dissolution, and disintegration are all involved in a complicated process of solvent extraction of coal by tetralin.

22. Space Technology

AD-464 181 Field 22A, 22B, 18N
CFSTI Price: HC$1.00

RAND Corp., Santa Monica, Calif.
A CONSERVATIVE ESTIMATE OF THE METEOROID PENETRATING FLUX,
by R. L. Bjork. 11 Feb 60, 12p
Rept. no. P-1913
Unclassified report

To be published in the proceedings of SNAP sponsored symposium on meteoroid penetration.

Descriptors: (*Meteors, Reactor hazards), (*Space flight, Hazards), Astronautics, Spacecraft, Nuclear power plants, Reactor shielding calculations, Vulnerability, Penetration.

A conservative estimate is given of the meteoroid penetrating flux for the purpose of assessing the meteoroid hazard to space power stations being designed under the SNAP program.

N65-16889 Field 22B, 11D
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
STRUCTURAL AND MATERIALS INVESTIGATION OF A 1/8-SCALE-MODEL SPACE STRUCTURE OF TOROIDAL CONFIGURATION AND FILAMENTARY CONSTRUCTION,
by Jerry G. Williams and George P. Goodman.
Feb 65, 40p NASA-TN-D-2652 Unclassified report

Descriptors: (*Filament wound construction, Inflatable structures), (*Manned spacecraft, Filament wound construction), (*Inflatable structures, Conical bodies), Model tests, Materials.

N65-17122 Field 22A
CFSTI Prices: HC$6.00 MF$1.25

Marquardt Corp., Van Nuys, Calif.
STUDY OF THE RETRIEVAL OF AN ASTRONAUT FROM AN EXTRA-VEHICULAR ASSIGNMENT,
by Warren H. Straly and Robert W. Adlhoch. Feb 65, 204p
Contract NAS1 2577 Unclassified report
NASA CR-185

Descriptors: (*Astronauts, Recovery), (*Spacecraft docking, Astronauts).

N65-17328 Field 22B, 9C, 11H, 13I
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EVALUATION OF FIVE BEARING-SEPARATOR MATERIALS AND POLYPHENYL ETHER LUBRICANTS FOR USE IN SPACE POWER GENERATION SYSTEMS,
by William R. Loomis. Mar 65, 16p
NASA-TN-D-2663
Unclassified report

Descriptors: (*Generators, Spaceborne), (*Bearings, Materials), (*Lubricants, Generators).

N65-17452 Field 22B
CFSTI Prices: HC$4.00 MF$0.75

General Electric Co., Philadelphia, Pa. Missiles and Space Div.
STUDY FOR DEVELOPMENT OF ELASTOMERIC THERMAL SHIELD MATERIALS.
Rept. for 1 Jul 63-1 Jun 64,
by C. M. Dolan. Mar 65, 97p
Contract NAS1 3251 Unclassified report
NASA CR-186

Descriptors: (*Atmosphere entry, Thermal insulation), (*Elastomers, Thermal insulation), (*Thermal sulation, Elastomers), Ablation, Silicon compounds, Reentry vehicles.

N65-18205 Field 22B, 6M
CFSTI Prices: HC$3.00 MF$0.50

Castle (Wilmot) Co., Rochester, N. Y.
STUDIES FOR STERILIZATION OF SPACE PROBE COMPONENTS,
by Martin G. Koesterer. Mar 65, 57p
Contract NASw879
NASA CR-191
Unclassified report

Descriptors: (*Space probes, Biological contamination), (*Biological contamination, Space probes), (*Spores, Space biology), Decontamination, Heat treatment, Spacecraft.

N65-18206 Field 22D
CFSTI Prices: HC$3.00 MF$0.75

Douglas Aircraft Co., Inc., Santa Monica, Calif.
COMPILATION OF SHOCK AND VIBRATION FLIGHT DATA FROM EIGHT THOR-RELATED VEHICLES,
by E. C. Meltzer. Mar 65, 86p
Contract NAS1 4392
NASA CR-196
Unclassified report

Descriptors: (*Launch vehicles(Aerospace), Flight).

N65-18499 Field 22A
CFSTI Prices: HC$4.00 MF$1.00

TRW Space Technology Labs., Redondo Beach, Calif. Engineering Mechanics Lab.
FEASIBILITY STUDY AND DESIGN OF PASSIVE DAMPERS FOR A MANNED ROTATING SPACE STATION.
Mar 56, 127p
Contract NAS1 3400
NASA CR-163
Unclassified report

Descriptors: (*Space stations, Attitude control systems), (*Attitude control systems, Space stations), Feasibility studies, Stability, Spacecraft.

N65-19281 Field 22B, 22C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
INFLUENCE OF SOLAR RADIATION PRESSURE ON ORBITAL ECCENTRICITY OF A GRAVITY-GRADIENT-ORIENTED LENTICULAR SATELLITE,
by William M. Adams, Jr., and Ward F. Hodge.
Mar 65, 22p NASA-TN-D-2715
Unclassified report

Descriptors: (*Satellites(Artificial), Orbital trajectories), (*Solar wind, Orbital trajectories), Perturbation theory, Communication satellites(Passive).

N65-19920 Field 22C, 22D
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
COMPARISON OF DIRECT AND INDIRECT ASCENT MODES FOR THE 1966-1967 MARS OPPORTUNITY WITH AN ATLAS-CENTAUR LAUNCH VEHICLE,
by Tim J. Kreiter. Mar 65, 20p NASA-TN-2739
Unclassified report

Descriptors: (*Ascent trajectories, Mars probes), (*Mars probes, Launch vehicles(Aerospace)), Transfer trajectories.

N65-20161 Field 22B
CFSTI Prices: HC$3.00 MF$0.75

Goodyear Aerospace Corp., Akron, Ohio.
PHOTOMETRIC MEASUREMENTS OF SURFACE CHARACTERISTICS OF ECHO I SATELLITE,
by Richard H. Emmons, Harvey E. Henjum, C. L. Rogers, and Darrell C. Romick. Apr 65, 78p
Contract NAS1 3114 Unclassified report
NASA CR-200

Descriptors: (*Communication satellites(Passive), Surface properties), Satellites(Artificial), Photometry, Reflection, Geometry, Vapor plating, Aluminum, Space environmental conditions.

N65-20475 Field 22B, 20K
CFSTI Prices: HC$3.00 MF$0.75

Astro Research Corp., Santa Barbara, Calif.
SOME DYNAMICS PROBLEMS ON INFLATION OF BUBBLES IN SPACE,
by Odus R. Burggraf. Apr 65, 52p
Contract NASw-652
NASA CR-203
Unclassified report

Descriptors: (*Bubbles, Inflatable structures), (*Inflatable structures, Spaceborne).

N65-20991 Field 22A, 20M
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
TRANSIENT SURFACE TEMPERATURE DISTRIBUTION OF A THIN-WALLED SPHERE SUBJECTED TO RADIATION IN SPACE,
by Glenn E. Schober. Apr 65, 28p
NASA-TN-D-2728
Unclassified report

Descriptors: (*Heat transfer, Space environmental conditions), (*Spheres, Heat transfer).

N65-21282 Field 22C, 16B, 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
MEASUREMENT OF OPTICAL RADIATION FROM THE WAKE OF ABLATING BLUNT BODIES IN FLIGHT AT SPEEDS UP TO 10 KM PER SECOND,
by Jack D. Stephenson. Apr 65, 50p NASA-TN-D-2760
Unclassified report

Descriptors: (*Blunt bodies, Ablation), (*Ablation, Light).

N65-21737 Field 22A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Washington, D. C. Scientific and Technical Information Div.
BIBLIOGRAPHIES ON AEROSPACE SCIENCE; A CONTINUING BIBLIOGRAPHY.
Apr 65, NASA-SP-7006 (01)
Unclassified report

Descriptors: (*Astronautics, Bibliographies).

N65-23160 Field 22D
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
FLIGHT PERFORMANCE DATA FROM THE SCOUT X-258 ROCKET MOTOR,
by James A. Nagy. May 65, 48p NASA-TN-D-2756
Unclassified report

Descriptors: (*Launch vehicles(Aerospace), Rocket motors), (*Rocket motors, Flight testing).

N65-23161 Field 22B, 14C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SURVEY OF CONTINUOUS-LOOP MAGNETIC TAPE RECORDERS DEVELOPED FOR METEOROLOGICAL SATELLITES,
by Kenneth W. Stark and Arthur F. White, Jr. May 65, 17p NASA-TN-D-2766 Unclassified report

Descriptors: (*Meteorological satellites, Magnetic recording systems), (*Magnetic recording systems, Meteorological satellites).

N65-23254 Field 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
SIMULATOR STUDY OF PILOT-CONTROLLED LUNAR TAKE-OFF AND RENDEZVOUS,
by Charles P. Llewellyn. May 65, 39p
NASA-TN-D-2778 Unclassified report

Descriptors: (*Lunar trajectories, Flight control systems), (*Rendezvous spacecraft, Flight control systems).

N65-23691 Field 22C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
GUIDANCE OF A LOW L/D VEHICLE ENTERING THE EARTH'S ATMOSPHERE AT SPEEDS UP TO 50,000 FEET PER SECOND,
by Henry C. Lessing and Robert E. Coate.
May 65, 32p NASA-TN-D-2818
Unclassified report

Descriptors: (*Atmosphere entry, Guidance), (*Guidance, Atmosphere entry).

N65-23817 Field 22B, 14B
CFSTI Prices: HC$3.00 MF$0.75

Measurement Analysis Corp., Los Angeles, Calif.
THE DEVELOPMENT OF VIBRATION TEST SPECIFICATIONS FOR SPACECRAFT APPLICATNS,
by G. H. Klein and A. G. Piersol. May 65, 49p
Contract NAS5 4590 Unclassified report
NASA CR-234

Descriptors: (*Test methods, Vibration), (*Vibration, Test methods), (*Spacecraft, Test methods), Specifications.

N65-23827 Field 22C, 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
STUDY OF THE STABILITY AND DRAG AT MACH NUMBERS FROM 4.5 TO 13.5 OF A CONICAL VENUS-ENTRY BODY,
by Peter F. Intrieri. May 65, 48p
NASA-TN-D-2827
Unclassified report

Descriptors: (*Reentry vehicles, Aerodynamic characteristics).

N65-24374 Field 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A STUDY OF LUNAR LANDING SITES AND ASSOCIATED STAY TIMES,
by Laurence W. Enderson, Jr. May 65, 36p
NASA-TN-D-2795

Unclassified report

Descriptors: (*Moon, Landing fields).

Patent 3,189,299 Field 22A

DYNAMIC PRECESSION DAMPER FOR SPIN STABILIZED VEHICLES.
Patent assigned to NASA,
by Howell D. Garner and Henry J. E. Reid, Jr.
15 Jun 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Rotation, Damping), (*Spacecraft, Stabilization systems), Patents, Motion, Spin, Dynamics, Signals.

The dynamic precession damper is for a spin stabilized space vehicle. A threshold device produces a signal related to an angular movement of the vehicle about an axis in a plane perpendicular to the spin axis of the vehicle. The signal is used to fire a reaction jet to reduce the angular movement.

Patent 3,191,316 Field 22A, 22B

LUNAR LANDING FLIGHT RESEARCH VEHICLE.
Patent assigned to NASA,
by Kenneth L. Levin and John G. Allen, Jr. 29 Jun 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lunar craft, Flight simulators), (*Flight simulators, Lunar craft), Lunar environment, Astronauts, Training devices, Manned spacecraft, Simulators, Patents.

The flight research vehicle is utilized for simulating lunar landings. The vehicle includes a main life engine, main lift rockets, vehicle attitude controls, engine attitude controls, landing gear structure, a safety and recovery system, and a cockpit and cockpit display.

Patent 3,191,994 Field 22B, 13L

ARM RESTRAINT.
Patent assigned to Air Force,
by William C. Boyce. 29 Jun 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Safety harness, Arms), (*Astronauts, Safety harness), Safety devices, Aerospace craft, Patents.

The arm restraint is for use with a restraint system for the protection of astronauts or occupants of high performance aircraft. The restraint is associated with a contoured arm rest. It leaves the hand and arm free and unencumbered when restraint is not applied.

Patent 3,192,476 Field 22B, 9F

METHOD AND SYSTEM FOR OBTAINING DATA REGARDING THE SURFACES OF CELESTIAL BODIES.
Patent assigned to Navy,
by Harold D. Nuffer and Richard G. McCarty.
29 Jun 65,

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Space probes, Telemeter systems), (*Telemeter systems, Space probes), Extraterrestrial topography, Optical scanning, Television cameras, Spacecraft, Patents.

The system is utilized in the field of space probing for recording and telemetering information obtained through the use of a camera device mounted in a space vehicle. A tape recorder is used on the space vehicle for recording phenomena while at the same time transmitting the data to earth.

PB-167 898 Field 22C, 17H
CFSTI Prices: HC$3.00 MF$0.75

Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
CATALOG OF PRECISELY REDUCED OBSERVATIONS NO. P-13. 1962 Beta Mu 1 (ANNA 1B).
19 Mar 65, 69p Special rept. no. SAO-SR-168
Grant NsG87 60

Unclassified report

Report of Research in Space Science.

Descriptors: (*Satellites(Artificial), Optical tracking), (*Optical tracking, Satellites(Artificial)), Orbital trajectories, Position finding, Tracking cameras, Azimuth, Tables, Catalogs.

The positions of artificial satellites as obtained by the SAO Photoreduction Division from the precise reduction of the films taken at the 12 Baker-Nunn Camera Stations are listed. The catalog includes 1845 observations of Satellite 1962 Beta Mu 1 (ANNA 1B passive) and 902 observations of Satellite 1962 Beta Mu 1 (ANNA 1B flash).

PB-167 986 Field 22B, 4B
CFSTI Prices: HC$2.00 MF$0.50

Aerospace Corp., El Segundo, Calif. El Segundo Technical Operations.
GHOST AND SCOMO SYSTEMS COST ANALYSIS,
by R. M. Carlisle. 14 Apr 65, 39p
Rept. no. ATR-65(7060)-5
Contract CWB10857

Unclassified report

Descriptors: (*Atmospheric sounding, Meterological satellites), (*Meteorological satellites, Costs), Meteorological balloons, Meteorological parameters, Meteorological instruments, Barometric pressure, Atmospheric temperature, Humidity, Wind, Tracking, Power supplies, Electronic equipment, Orbital trajectories, Launching, Microminiaturization(Electronics), Solar cells.

The report examines the costs of a satellite system designed to relay data from (1) a global network of free-floating meteorological balloons (GHOST), and/or (2) a network of sea and land based meteorological stations (SCOMO), to the Weather Bureau central data processing station in Suitland, Maryland. The GHOST system (Global Horizontal Sounding Technique) will provide meteorological data from up to 6000 balloons floating at constant density altitudes. The balloons are equipped with instrumentation for determining atmospheric pressure, temperature, and humidity. Primary datum desired from the balloons is wind velocity; this is determined by observing changes in balloon position using a Navy-developed hyperbolic tracking system (Omega). Costs associated with the balloon, balloon electronics, and operation of eight ground-based Omega tracking stations (to provide world wide coverage) are developed in the report, in addition to the costs of the satellite system. The SCOMO system (Satellite Collection of Meteorological Observations) provides data from sea and ground stations regarding station identity, wind velocity, air and sea temperature, and atmospheric pressure. If the station is manned, additional data on cloud cover and sea state are also collected. Costs associated with these sea or ground based SCOMO stations are not developed as a part of this study.

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MRB4006Q7	10	AD-413 018
MRB4006Q8	10	AD-421 013
MRB4006Q9	10	PB-167 632
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MRC-TSR-110	12	PB-167 728
MRC-TSR-277	12	AD-279 281
MRC-TSR-291	12	AD-280 295
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MRC-TSR-315	12	AD-280 830
MRC-TSR-317	12	AD-280 831
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NAVWEPS-17-20AG-96	9	PB-167 756
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NAVWEPS-17-20AQ-25	9	PB-167 758
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SSD-TDR-64-250	11	PB-167 817
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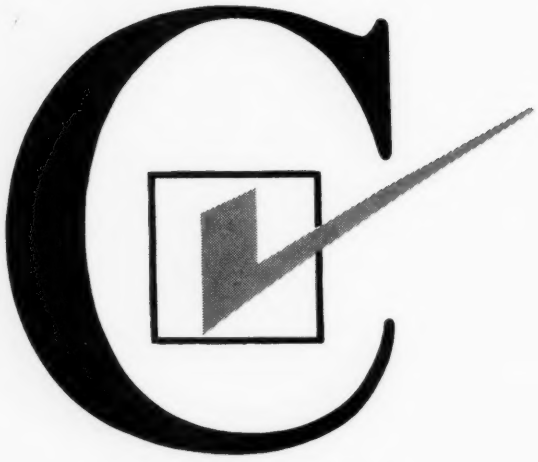

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